The Development of Theory of Mind and Social Competence in Young Pakistani Children

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Abstract

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Key Words: Theory of Mind (ToM), Social Competence, Executive Functioning, Culture, Parenting

Theory of mind (ToM) refers to a cognitive ability that enables one to attribute mental states (such as desires, emotions, beliefs) to self and others. In recent years researchers have identified cultural variations in the onset of ToM understanding in collectivist and individualist cultures. However, the findings of cross-cultural studies regarding these variations are inconsistent. The major aim of this innovative research was to investigate differences in the acquisition of ToM in children from a collectivist culture (Pakistan) and an individualist culture (UK). The second aim of the study was to assess the specific association between ToM and social competence in a culturally diverse sample. An additional aim of the study was to investigate the universality of various correlates of ToM such as executive functioning (EF), parenting styles, and maternal mental state talk. The findings of the studies demonstrated a significant delay in the acquisition of ToM in Pakistani children, when compared with Western children from individualist societies. These findings were corroborated by the results of novel cross-cultural study that compared the performance of White British, British Pakistani, and Pakistani children on a ToM scale. White British children outperformed both Pakistani and British Pakistani children on measures of ToM, EF, and social competence. The current findings also provide support for the association of mental state understanding with EF, social competence, parenting styles, and maternal mental state talk. These findings have important implications for the role of general (collectivist vs. individualist cultures) as well as specific cultural practices (such as parenting and education) in the acquisition of mental state understanding.

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Chapter 1

Thesis overview

1.1 Introduction and aims

Theory of mind (ToM) is a cognitive ability that allows people to understand that the behaviours of other social agents are the products of their internal mental states such as beliefs and desires, and that these mental states are distinct from one's own mental states (Doherty 2009). For instance, Sam went into the kitchen because he wanted a cookie and looked for a jar in the cabinet because he believed the cookies were kept in the jar. Sam's behaviours were directed by his internal states of desire and belief, and not by the external reality. The real world situation could have been different (e.g. the jar of biscuits had been moved to another cabinet by Sam's mother) in which case Sam's belief would be false. However, Sam's behaviour was based on his beliefs and not the real life situation.

It has been suggested that most typically developing children acquire ToM ability around 4-5 years of age (Wellman et al. 2001). However, the findings of cross-cultural research on the issue are inconsistent with some studies indicating synchrony in the age of ToM development across cultures (Callaghan et al. 2005), whereas others suggest a difference of up to 2 years in average age of ToM acquisition (Liu et al. 2008). Some studies have indicated that children from collectivist cultures (such as China and Iran) show a lag in performance on ToM tasks when compared with children from individualist societies (such as America and Australia) (Naito and Koyama 2006; Liu et al. 2008; Hughes et al. 2014; Wang et al. 2016). However, there is little research on mental state understanding in the collectivist culture of Pakistan. Pakistan, although is a collectivist society like China, it has many disparities from other collectivist societies. For instance, Pakistan is a Muslim state and the influence of religious teachings is strong in every aspect of social life. In addition, Pakistani culture is also influenced by the rich traditions of ancient Indian and Indus valley civilizations. There are also other social and economic disparities make Pakistani culture distinct from other

collectivist cultures such as China. The first aim of the thesis was to investigate ToM development in children from a unique Eastern Collectivist culture of Pakistan. In addition, the current research also provided an opportunity to investigate the Pakistani diaspora settled in the UK. British Pakistanis are living in an individualist Western culture while experiencing the traditional collectivist values of their immigrant Pakistani parents. The influence of both collectivist and individualist culture might have an effect on the development of mental state understanding. The current study allowed investigation of a unique situation where a collectivist culture is transplanted into a Western society. Comparing the mental state understanding of children from these two unique cultural situations: Pakistani (from collectivist culture) and British Pakistani (influences of both collectivist and individualist cultures) with White British children (from an individualist culture) could provide useful insights for ToM development.

Social competence is a complex construct that incorporates various social, cognitive and emotional skills that are crucial for effective social adaptation (Semrud-Clikeman 2007). Effectiveness in social interaction has been identifies as a central aspect of social competence by many researchers (Rose-Krasnor 1997). The characteristics associated with social competence often include the ability to achieve desired outcomes/goals, maintaining positive relationships with others and adaptability across various social settings (Howes 1987; Duck 1989). Rose-Krasnor (1997) has suggested four approaches for the assessment of social competence: assessment of specific skills, sociometric status, positive relationships and functional outcomes. It can be argued that an advanced ToM allows people to become better mind readers and transforms their social interactions and skills, thus playing a major role in helping people to develop effective social relationships. However, research investigating the links between ToM and social competence has yielded inconsistent findings (Badenes et al. 2000; Capage and Watson 2001; Charman and Campbell 2002; Cassidy et al. 2003; Etel and Yagmurlu 2014). The second aim of the current research was to investigate the links between ToM and social competence using two approaches

for assessment of social competence; sociometric status (peer popularity/acceptance) and social skills approach.

ToM has also been associated with several components of executive functioning (EF) (Perner and Lang 2000; Moses 2001). EF is a manifold concept that includes several components such as self-regulation, behavioural organization, planning, inhibitory control, cognitive flexibility, error detection and correction, and working memory (Luria 1973; Goldberg and Bilder 1987; Carlson and Moses 2001; Blair et al. 2005; Diamond, 2006). However, empirical evidence indicates that some aspects of EF (such as inhibition control and planning ability) relate more strongly to ToM than others (Carlson and Moses 2001; Carlson et al. 2002). Longitudinal studies investigating the link between ToM and EF have indicated that early differences in EF predicted later variations in false belief understanding (Carlson at al. 2004; Muller et al. 2012; Marcovitch et al. 2015). Keeping in view the strong empirical evidence for association between ToM and EF, the aim here was to test the universality of this relationship in a collectivist culture. If the relationship between the two remains consistent in a different cultural situation, it will further add authenticity to the established link of ToM and EF.

The final aim was to investigate the role of certain environmental factors in the acquisition of mental state understanding in Pakistani children. Specifically the association of two parental factors; parenting styles and maternal mental state talk, was investigated alongside ToM understanding. The term parenting styles refer to patterns of behaviours exhibited during parent-child interactions in a wide range of situations (Darling and Steinberg 1993). The techniques parents use to discipline, train and socialize their children represent their parenting styles. The most widely accepted classification of parenting styles was suggested by Diana Baumrind in 1960s, who identified three distinct parenting styles (authoritarian, authoritative, and permissive) based on the level of responsiveness and control exhibited by parents. Parental responsiveness refers to warmth, acceptance and reasoned communication (Baumrind 2005). Demandingness on the other hand is characterized by the degree of control and supervision exerted by parents (Baumrind 2005). It includes techniques such as behaviour regulation,

confrontation, control and monitoring the child's activities. A combination of low or high responsiveness and demanding behaviours constitute different parenting styles (Baumrind 2005). Authoritarian parenting style is characterized by high levels of control and low levels of responsiveness. Authoritative parenting constitutes of high levels of control as well as responsiveness. Permissive parenting on the other hand is characterized by low levels of both responsiveness and control (Baumrind 1966).

Although the research investigating links between ToM and parenting styles suggests a favourable effect of authoritative parenting style for mental state understanding, the findings are inconsistent (Hughes et al. 1999; Vinden 2001; Ruffman et al. 2006; O'Reilly and Peterson 2014). In addition, most of these studies were conducted with a Western population living in individualist cultures. Research has also indicated variations in parenting styles of Asian and American parents (Leung et al. 1998; Vinden 2001). American parents reported practicing more authoritative techniques, whereas Asian parents state that they practice more authoritarian parenting styles (Dornbusch et al. 1987; Vinden 2001). Therefore, the aim here was to investigate the association between parenting styles and mental state understanding in an Asian collectivist society.

Regarding the content of parent-child conversations, it has been suggested that references made to mental states (such as want, think, desire etc.) by mothers are of particular importance for developing an understanding of mind (Ruffman et al. 2002; Adrian et, al. 2007). Exposure to language about mental states enables the child to internalize the notion that thoughts and desires reside in the minds of others (Symons 2004). Cultural variations have also been reported in content of mothers' language during conversation with the child. For instance, it has been reported that European American mothers made more references to thoughts and emotions, whereas Chinese mothers referred more to behaviours during their conversations (Doan and Wang 2010). Such variations indicate that the children whose mothers made frequent references to mental state terms would exhibit an advanced understanding of ToM compared to those who were less exposed to mental state language. It is therefore important to investigate content of parent-

child discourse in various cultures to identify how the parental language influences mental state understanding in children. To the author's knowledge no published data is available about the discourse of parent child conversation in Pakistan. The current innovative research therefore aimed to investigate the use of mental state terms by Pakistani mothers during a joint story telling session with the child. This would provide an opportunity to test the universality of links between ToM and maternal mental state reported in individualistic Western societies.

1.2 Overview of thesis structure

The following section provides an overview of the thesis structure. The thesis consists of six chapters and the current chapter is chapter 1. A brief overview of the content of rest of the chapters is given below.

Chapter two provides an in depth overview of ToM, its history and development over the past decades. It also includes literature relevant to developmental course of ToM and different mental states, its assessment, theoretical approaches and sources of variability in ToM. Furthermore, the chapter explores how ToM is related to EF and provides a review of research in the field. The next section of this chapter introduces the construct of social competence and its components. Different approaches to assessment of social competence are reviewed. In addition, the section explores the links between social competence and ToM. The final section of this chapter provides a rationale for the research included in this thesis.

Chapter three is the first empirical chapter that consists of two preliminary studies aimed to assess ToM development in young Pakistani children. Research evidence indicates that ToM is delayed in Asian children (specifically Chinese and Japanese), however little is known about ToM development in children from other collectivist cultures. The current research focused on a cultural group that is similar to Chinese and Japanese in that it is also a collectivist society, however, Pakistani culture differs from other collectivist cultures in many aspects (religious, social and academic). Furthermore, there is very limited research (only one published study so far) on ToM development in Pakistani children. An additional aim of the studies

included in this chapter was to investigate how ToM related to EF and SC in a culturally different sample.

Chapter four is the second empirical chapter and consists of a cross-cultural study that was designed to verify the findings of the two initial studies included in Chapter 3. The study compared ToM development in three diverse cultural groups; White British, British Pakistani, and Pakistani children. Furthermore, the universality of links between ToM, EF, and social competence were also investigated in the study.

Chapter five is the final empirical chapter, in which the effect of parental factors (specifically parenting styles and maternal mental state talk) on the development of ToM in Pakistani children were investigated. In this chapter the links between parenting styles and social competence were also clarified. In addition, several significant predictors of ToM in Pakistani children were identified.

Chapter six is the last chapter that brings together the main findings of the empirical chapters. The implications of these findings for ToM research have been discussed and several recommendations have been made for future research.

Chapter 2

Literature Review

2.1 Introduction

Theory of mind (ToM) is a prominent area of research in developmental psychology for last three decades. The first section of this chapter presents an overview of theory of mind (ToM), its definition, history and development over the past few decades. The section also includes a description of various mental states, frequently used ToM tasks, an overview of the different theories of ToM, and socio-cultural factors associated with the development of a theory of mind. A significant correlate of ToM is executive functioning; a set of higher-order, self-regulatory cognitive processes that monitor and control thought and action. Therefore, the second section of this chapter includes a brief review of research on EF and its link to ToM. The third section of this chapter consists of a review of theoretical and empirical studies relevant to social competence. This section explores various facets of social competence and how they have been measured. It also provides a review of the research investigating the link between ToM and social competence. The final section summarizes the link between the variables discussed in the chapter and explains how they are investigated in the current thesis.

2.2 Theory of Mind

Human beings live in a multifaceted social milieu where they are constantly interacting with others around them. These interactions vary in complexity from simple every day dealings (e.g. sharing greetings) to complicated situations (e.g. confronting a cheating partner), and require a number of social and cognitive skills. Irrespective of the complexity of the interaction or situation, we as social agents are immersed in the attempt to understand other individuals, and be able to explain or sometimes predict their behaviours. For example, on her return from work Sarah

sees her neighbour Julie in the driveway and goes to say hello. Julie rushes inside her house after seeing Sarah coming towards her, leaving Sarah in a perplexed situation. Why did Julie do that? Did she do this intentionally or inadvertently? Was she in a hurry or was she upset about something? Could it be something Sarah had said earlier that had upset Julie? May be she just had a bad day and was not in a mood to talk. In interactions such as this, we try to understand other people's behaviour, and in order to do that we consider their intentions, desires, beliefs, and emotions (Astington 1993). The cognitive ability that enables an individual to attribute desires, emotions, beliefs etc. to others is known as Theory of Mind (ToM) (Slaughter et al. 2002). In order to comprehend the concept of ToM, it is helpful to first understand what the mind is.

2.2.1 What is Mind?

This question has preoccupied thinkers and philosophers since ancient times. Various explanations and theories have been formulated in an attempt to upsurge our understanding of mind (Astington 1993). The principal interpretation of the mind has been focused on two aspects; a physical observable feature, and a nonphysical intangible feature. We have a physical existence in form of a body that is visible to others, and we perform actions like running, jumping, eating, talking, and laughing that others can see. Our external behaviours are observable and therefore accessible to others. However, the internal sources of our behaviours (such as intentions, thoughts, desires, beliefs and hopes) are not accessible to others. For example, we can observe a person go to the market and fetch some apples, however we can not observe the person's belief that the apples are sweet which is why they got the apple. Similarly, we cannot observe others' desires, intentions, thoughts, hopes, fears, dreams, plans and so on. These are all states of mind (otherwise known as mental states) (Astington 1993). Philosophers and theorists argue that although, mental states originate in neural activity in brain but the brain is not the same as the mind (Astington 1993). They consider the brain a physical entity whereas the mind is a collection or representation of mental states that originate in the brain (Astington 1993). Mental states therefore are also known as 'mental representations', because the mind represents these states (Astington

1993). The earlier enquiries into children's understanding of mind focused on whether they could distinguish mental form physical (e.g. image of objects and the real objects). Experiments that investigated whether young children could distinguish between real food (that could be touched and smelled) and unreal food (e.g. someone thinking about food or a picture of food) revealed that children as young as 3 years old knew that an image of food is not real food and cannot be touched or smelled (Harris, et al. 1991; Watson et al. 1998). This, however, is just the first step in developing an understanding of mind and how mental states influence our behvaiours.

2.2.2 Theory of Mind

In everyday life, we do not concern ourselves with the differences between the brain and the mind. However, we do demonstrate a deep-seated understanding of the mind by frequently referring to mental states. We refer to these states in order to make sense of our own and other's actions. In other words, we exhibit an inherent understanding that other people have desires, beliefs, intentions and so on and that these mental states determine their behaviours (Astington 1993). This understanding of 'mind' is known as Theory of Mind (ToM) (Astington 1993).

Historically, the cognitive development theory of Jean Piaget remained predominant in developmental psychology until late 20th century (Doherty 2009). Piaget was a pioneer in the field of cognitive development and provided foundation for later research (Astington 1993). Before the age of 6, according to Piaget, children fail to distinguish between mental entities (such as thoughts, concepts, mental images and dreams) and physical things that exist in the environment (Astington 1993). This inability to differentiate between thoughts and physical objects, between doing something and imagining it, is referred to as **'childhood realism'**. Piaget suggested that children associate the characteristics of physical presence with mental entities. For example, they thought dreams are present in the room and others can also see them or that they could not differentiate the concept or a mental image of a house from a real house. A child who is unable to distinguish between a physical object and thoughts about it would clearly have

difficulties understanding the concept of mental states and how these are independent of external physical reality (Astington 1993).

In Piaget's opinion, children not only relate physical characteristics to mental entities, but they also make the error of associating mental life to inanimate physical objects (Piaget 1929). Piaget's concept of **'childhood animism'** implies that children consider physical objects around them as living beings. In a child's world, the trees, rocks, moon, wind and clouds are alive and do things because they want to do it, just like human beings do (Piaget 1929). Children believe that these physical objects have a mental life because they can think, feel, and want (Astington 1993). Associating mind like characteristics to inanimate objects also indicates that children do not fully grasp the concept of mind or mental states. Piaget proposed that children comprehend the world in such a way because they are not aware of the existence of different perspectives or points of view (Astington 1993). **'Egocentrism'** refers to a child's inability to take another person's perspective (Piaget and Inhelder 1956). Consequently, children do not realize that their own perspectives may be different from those of others, or that they may be reporting their own perspective when asked about someone else's (Flavell 2000). The inability to distinguish between one's own and other's perspective again indicates a failure to comprehend that others have a mind, which is distinct from our own. Thus, making children oblivious of the concept of mental states. According to Piaget, later in childhood, around the age of seven, there is a sudden shift from egocentric thinking to understanding another person's perspective (Piaget and Inhelder 1956). However, the research in ToM development in 1980s and 90s revealed that children exhibit the ability to understand other's beliefs as early as 4 years of age.

The term ToM first appeared in a ground-breaking paper by David Premack and Guy Woodruff (1978), which questioned whether chimpanzees understood the mental states of others. In the paper they offered this definition:

> "An individual has a theory of mind if he imputes mental states to himself and others. A system of inferences of this kind is properly viewed as

a theory because such states are not directly observable, and the system can be used to make predictions about the behaviour of others." (p. 515)

In their experiments, Premack and Woodruff (1978) showed chimpanzees videos of human actors faced with a problem, and at the end of the video they showed pictures of different objects, one of which gave a solution to the problem. They found that chimpanzees could correctly choose solutions for problems for someone else (e.g., they saw an actor trying to open a door and correctly chose "keys" from a group of pictures). On basis of these experiments, Premack and Woodruff (1978) concluded that the chimpanzees were able to attribute mental states (such as desire) to someone else and used these to predict the actor's behaviour. An interesting recommendation, generated by Premack and Woodruff's (1978) paper was that it might also be possible to test whether animals had a concept of someone else's belief (Dennett 1978; Harman 1978). Dennett (1978) suggested the 'unexpected transfer' method to test the conception of belief in animals. In this method, the participant animal sees a person put an object Y in container A and leave the scene. Another person then moves object Y from container A to container B. If the participant animal acts as if it expects the returning person to look for Y in A rather than B, then this indicates some understanding of belief. The research into ToM in animals intrigued developmental psychologists to question the 'egocentrism' of Piaget's theory and investigate the development of young children's understanding of mental states, specifically belief.

2.2.3 Belief and False Belief

Although there are many states of mind, Wellman (2014) considers beliefs and desires, as the most fundamental mental states for understanding human mind and behaviours. According to Doherty (2009) understanding beliefs enables us to predict, explain, and manipulate behaviours. Beliefs are intentional states of mind that are about or directed at some object. We have beliefs about other people or objects or situations (such as this is an apple, the grapes are sour, my neighbour is an arrogant person). Although beliefs are distinct from reality, they are directed at the reality as compared to some other mental states such as imagination or

dreams that stand apart from reality (Wellman 2014). We have beliefs about physical things that exist around us, such as we believe that the tree in the yard is a mango tree and the mangoes on the tree are sweet. Beliefs are usually true because they are about external reality. Predicting behaviour from a true belief does not tell much about the mental states, the person predicting the behaviour might be basing their judgment on the reality without giving any consideration to mental state (Doherty 2009). However, it is possible for an individual to have a belief that contradicts the real world situation and is therefore referred to as false belief. Moreover, our actions tend to be based on what we believe about the external world, and not what the external reality actually is. For example, Hannah picked the mangoes from tree because she believed they were sweet, but when she ate them they were actually sour. In this case, Hannah's belief that the mangoes are sweet was contradictory of the reality, and therefore, a false belief. Hannah's behaviour (picking the mango from the tree), however was based on her false belief and not the real world situation. The understanding of false belief demands the realization that our mental states may reflect or represent the reality of the world, however, they are separate and may be contradictory of the real world situation.

Following the lead of Dennet's (1978) 'unexpected transfer' method, Wimmer and Perner (1983) used a test of false belief understanding to investigate ToM understanding in young children. False belief (FB) tests allow the child to exhibit his/her understanding of the distinction between mental states and the real world. An example of a false belief task is the classic Sally-Anne task (Baren-Cohen et al. 1985). In this task, the child participant sees Sally (a doll, puppet or a cartoon character) place a marble in a green box and go outside. In Sally's absence another character, Anne takes out the marble from green box and puts it in a red box. Anne then leaves and after a while Sally comes back. The child is then asked where would Sally look for the marble, in green box or the red box? Answering the question in this task correctly taps into children's ToM because they can only answer it correctly if they are able to represent Sally's wrong belief (that the marble is in green box) as different from their knowledge of the reality (that the

marble is really in red box when sally returns to the room). Performance on FB tasks has been considered a good indicator of mental state understanding. In fact Doherty (2009) considers it a diagnostic test for ToM understanding and therefore a large body of research has accumulated using a variety of FB tasks.

There are many variations in FB tasks, most of which include unexpected location, identity, or content. In unexpected identity tasks the appearance of an object is altered to make it look like some other object, for example a sponge covered with granite grey paint to make it look like a rock (Flavell et al. 1983). The child is first shown the object from a distance and asked what he/she thinks it is. Then he/she is allowed to touch it and see that it is not a rock but a sponge. After that the child is asked what would another person, who has not touched the object, think it is? If the child responds with correct answer (i.e. rock) he/she is accredited of being able to take another person's perspective, or having a ToM. In the unexpected contenmt tasks, the contents of a clearly marked container or box are replaced with unexpected materials. A famous unexpected content task uses a 'smarties' sweet box filled with crayons (Gopnik and Astington 1988). The child is first asked what he/she thinks is inside the box. Once they have seen the content of the box then they are asked what a third person that has not seen the contents, would think is inside the box. Again, if the child responds correctly in this task (i.e., they say that another person would think the box would contain smarties) he/she is said to possess a ToM (Gopnik and Astington 1988).

The standard FB tasks mentioned above test a child's ability to predict behaviour based on someone's false beliefs. But according to Doherty (2009), understanding beliefs also helps in explaining and manipulating behaviours. However, it is unclear whether children acquire the ability to explain or manipulate the behaviour based on beliefs at the same time as they do to predict the behaviour. Doherty (2009) argues that it is reasonable to think that explaining behaviour would be easier than predicting it, as it is seemingly less cognitively taxing than prediction. In order to predict the behaviour correctly, the child must be aware of and remember what the other person knows or does not know (sally knows she placed the marble in the green box but does not know the marble has

been moved to the red box). They also need to be able to curb their own knowledge of the actual situation (the marble is now in the red box) (Doherty, 2009). Alternatively, in order to explain the behaviour, children observe what happens (Sally looks in the green box for the marble on her return) and are required to clarify why the person behaved the way they did (why did sally look in the green box when the marble actually is in the red box, because she thought it was in the green box). A basic understanding of belief is enough to explain such behaviour irrespective of how or why the belief was formed (Doherty 2009).

Bartsch and Wellman (1989) tested children on an explanation vs. prediction task and concluded that explanation was easier than prediction. They told children a story where Bill had a cut on his hand and went to get a bandage. Children were earlier shown a Band-Aid box that was empty. In the explanation task, Bill goes to the Band-Aid box, and the children were asked, “Why do you think Bill is looking in there?” A prompt question was then asked, “What does Bill think?” Conversely, in the prediction task, children were asked where will Bill look for the bandage, in an empty Band-Aid box or a plain box that contained a bandage. Children as young as three years old were able to give belief based explanation (mostly after the prompt) 66% of the time, compared to 33% correct answers on the prediction task. Wimmer and Mayringer (1998) suggested that children might find explanation easier because unlike standard false belief tasks there is no obvious wrong answer in the explanation task. However, other studies failed to replicate these results and found that children mainly explained the behaviour in terms of character’s desire and not the belief (he went to the box because he wanted band aids rather than he believed there were band aids in the box) (Moses and Flavell 1990). Later studies that used rigorous questioning to investigate beyond desire-based explanation found that explanation was not easier than or was harder than prediction (Wimmer and Mayringer 1998; Wimmer and Weichbold 1994). For instance, one of the experiments investigated explanation and prediction conditions with a false location task (Wimmer and Mayringer 1998). One of the tasks was enacted using a two-room model: a cloakroom (with a small cloth hanger in it) and a paly room. In both the rooms there was a cupboard, which

was used as actual or false location for the object. In the story that was enacted, a doll hides her favourite storybook in the cloakroom cupboard and goes out to play with friends. In the doll's absence an adult doll finds the book in cloakroom and places it back in the playroom cupboard. In the explanation condition, when the doll comes back from play she goes directly to the cloakroom to get her book. At this point an explanation question was asked, "Why does the doll go to the cloakroom to get her book?" The doll's desire was intentionally put in the question to prevent children from giving desire-based explanation. When a child failed to respond to the explanation question, the experimenter rephrased the question as a belief explanation question: "the doll goes into the cloakroom, because she thinks the book is in this cupboard. Why does the doll think the book is in this cupboard?" In the prediction condition when the doll comes back from the play she stops in front of the two rooms and the experimenter asked the prediction question, "Where does the doll go to get her book?" In the case of a correct answer, the experimenter asked the explanation questions in the same way as in the explanation task. The results of the study indicated that the majority of 31/2- to 41/2-year-old children were unable to explain why the protagonist looked for the book in the wrong cupboard. Based on these findings Wimmer and Mayringer (1998) concluded that explanation was at least as difficult as prediction. It has been suggested that explaining behaviour requires a willingness to talk and verbal skills; that make it difficult for children (Doherty 2009). In sum, explanation of behaviour might appear easier than prediction of behaviour, but the evidence does not support this proposition.

An understanding of beliefs also allows one to manipulate the behaviours of others by deliberately trying to alter their beliefs. Concealing information, lying, and deception are some examples of the ways to manipulate another person's behaviour. Experiments investigating a child's ability to conceal information revealed that most 3 year olds were unable to keep a secret, but a large proportion of 4 year olds, and almost all the 5 year olds were able to do so successfully (Peskin and Ardino, 2003). In an attempt to investigate deception tendencies in young children, Peskin (1992) used a scenario where children had to deceive a

nasty puppet to get their desired object (stickers). The child initially identified stickers that he/she liked the most, liked somewhat, and liked the least. The experimenter then placed three stickers (one selected from each category that the child indicated liking the most, somewhat and least) in front of the child and introduced one of the two puppets; a nasty puppet that always selected the sticker that the child liked the most, and a nice puppet that would select any other sticker. The puppet got to select the sticker first, but would always ask the child which one was his/her favourite. Almost all the children indicated their favourite sticker while playing with the nice puppet. The majority of 4 year olds and almost all the 5 year olds were able to conceal their preferred choice while playing with the nasty puppet. However, most of the 3 year olds were unable to conceal their preferred choice from the nasty puppet.

Another important milestone in the development of ToM is the realization that things may not be as they appear (Doherty 2009). It has been argued that making a distinction between how things are and how they appear is the basis of many forms of deception and that the appreciation of appearance-reality allows us to go beyond external appearances (Doherty 2009). The tasks used for appearance-reality are the same as unexpected identity tasks mentioned above. Flavell et al. (1983) investigated understanding of appearance reality distinction as part of their research on children's perspective-taking abilities. They showed the children a sponge that looks like a rock and then allowed them to feel it, and acknowledge that it is in fact a sponge. Afterwards, the children were asked, 'what is this really? Is it really a rock or a piece of sponge? They were then asked 'When you look at this with your eyes right now, does it look like a rock or does it look like a piece of sponge?' Before the age of about 4 years, children tend to give the same answer to both the questions. In the case of the sponge-rock children incline to say it is a sponge and it looks like a sponge. However, 4 years and older children tend to say it is a sponge but it looks like a rock. Flavell et al. (1983) argue that the younger children fail this task due to the issues with dual representation. It is difficult for children to simultaneously represent an object's appearance and its reality. In addition, it has also been pointed out that there are many similarities in

appearance-reality and false belief tasks, specifically the unexpected content false belief task (Doherty 2009). For instance, children start to pass the two tasks at around the same age and the appearance-reality task can be easily modified to become a false belief task (Gopnik and Astington 1988; Dohery 2009). In case of false belief the distinction is between what the child knows about the object (its real nature), and what someone else will think when they first see the object (Doherty 2009).

2.2.4 Other Mental States

Desire: Although the research on ToM has largely focused on false belief understanding, there are essentially other mental states that allow one to understand and predict behaviours. In addition, Doherty (2009) suggests that false belief understanding does not arise in isolation, rather there are general changes in the way children understand mental states around 4 years of age. A grasp of desire, for example is crucial to understanding behaviours, however it has been largely neglected in ToM research (Doherty, 2009). It has been suggested that young children develop an understanding of desire well before they grasp the concept of belief (Wellman 1990). In an experiment with 14-18 month old infants, Repacholi and Gopnik (1997) used a food-sharing procedure by giving two bowls, one containing crackers and one containing raw broccoli. The infants naturally preferred the crackers. The experimenter then tasted each type of food and expressed disgust at the crackers, and liking at tasting the broccoli. The experimenter then pushed the bowls back towards the infant. She then, held out her hand and said, “Can you give me some?” the results of the study indicated that the 14-month-old infants almost always gave the experimenter crackers. However, the 18-month-old children gave the experimenter broccoli most of the time. The findings indicated that around 18 months of age infants start developing an understanding that the experimenter’s desired food differed from theirs. Furthermore, it is suggested based on the findings of Repacholi and Gopnik (1997) that by the age of around 18 months infants understand that objects are not inherently desirable or undesirable. In other words infants understand desire as a

subjective internal state that can differ from person to person (Repacholi and Gopnik 1997).

It has been argued that it is crucial to understand both, desire and belief states, in order to understand and predict behaviour (Wellman and Woolley 1990; Ziv and Frye 2003). For instance, consider the Sally-Anne Task of false belief. Sally goes to the boxes because she wishes to retrieve her marble. In other words, her action was instigated by her desire. She goes to the green box because of her false belief but when she does not find the marble in there, the state of her belief changes. However, her desire to get the marble still remains and would explain her subsequent behaviors (e.g. Sally looks elsewhere for the marble, may be in the red box where the marble actually is). Some researchers have suggested that the 3-year-olds' failure on the FB tasks is the consequence of their attention to the desire (Wellman and Woolley, 1990). In the Sally-Anne task, the children focus on Sally's desire to retrieve the marble and tend to ignore her false belief. Therefore, they respond to the test question by saying where Sally should look for the marble; in the red box because that is where the marble actually is, and not where she thinks it is (Wellman and Bartsch 1988; Wellman and Woolley 1990).

Knowledge: researchers have also investigated children's ability to understand that knowledge relates to experience (Wimmer et al. 1988; Pillow 1989; Pratt and Bryant 1990). There appear to be advancements in children's understanding of knowledge formation around the same age as they begin to pass the false belief task (Doherty 2009). Wimmer et al. (1988) investigated children's ability to judge knowledge versus ignorance. They brought two children into a room and showed them a box. One of the children was shown the contents of the box. The children had to judge whether they or the other child knew what was inside the box. Majority of the three year olds denied that the other child knew the contents of the box when he had looked inside the box. Half of the three year olds also stated that they knew the contents of the box without even looking inside the box. However, 4 years and older children were good at judging knowledge vs. ignorance (Wimmer et al. 1988). Such findings have been challenged by studies that demonstrated that children younger than 4 years of age could also distinguish

between the state of knowledge and ignorance (Pratt and Bryant 1990).

Another aspect related to knowledge is being able to appreciate the sources of knowledge. In an experiment Gopnik and Graf (1988) used one of three sources to inform children what was in a box. They either let the children see the contents of the box, or the experimenter told them what was in the box or the children guessed from a simple clue. They then asked the children how they knew what was inside. Were they told about it, saw it or did they get a clue. Four-year-olds were much better at remembering the source of knowledge compared to three year olds, who were unable to encode or remember the source of their knowledge. This indicates that around 4 years of age children begin to distinguish between learning something through perception and simply being told about it (Doherty 2009).

Emotion: The ability to understand and predict others' behaviours requires not only a grasp of beliefs and desires but also emotions (Wellman 2007). Emotions are a very important aspect of our everyday life and understanding of emotions is crucial for effective social functioning. Children first start to name and distinguish between different emotional expressions (such as sad, happy, angry etc.) around 3 to 4 years of age (Hughes and Dunn 1998; Cutting and Dunn 1999). Children's initial understanding of emotions is based on objective reality (Doherty 2009). This means that children associate happiness and sadness with the fulfilment of one's desires and wishes. At a later time they develop the understanding that emotions are belief based (Doherty 2009). In other words, irrespective of the real world situation (whether the desire has been fulfilled or not), emotions actually depend on one's belief regarding the situation (one will be happy if one believes the desire has been fulfilled). In a series of experiments, Harris et al. (1989) investigated 3-7 year olds on their ability to predict emotions based on objective reality or beliefs/desires associated with it. In one of the experiments they told children what an animal character liked and disliked (e.g elephant likes coke but hates milk); they then showed the animal being offered a container whose contents had been replaced (e.g. milk in a coke container). Children were then asked whether the animal would be happy or sad to get the container. The finding revealed that a majority of the 6 year olds were able to predict the emotion

correctly (i.e. the animal will be happy given their false belief regarding the contents of container). However, only a few 4 year olds predicted the emotion based on the belief of the character. Instead they judged the emotion based on their own knowledge of reality (the content of the container has been swapped) and failed to realize that the characters' emotions depend on what they believed to be true.

Hadwin and Perner (1991) investigated children's understanding of two emotions that were based on a person's belief about the objective reality. Their results indicate that children understand happiness as a result of a match between the desire and reality (getting what one wants makes a person happy) at three years of age. However, it is not until five years of age that children understand when 'happiness' is belief based (that is dependent upon the belief about reality and not the reality itself). Likewise, children younger than five years of age did not demonstrate an understanding of surprise. Since surprise is a consequence of a mismatch between what one believes about the state of reality and what the objective reality actually is, younger children failed to judge the emotion correctly. Rieffe et al. (2005) investigated children's references to mental states while explaining different emotions (happiness, sadness, anger and fear). According to their findings, four year olds rarely made references to beliefs/desires in their explanations, 6 year olds gave belief based explanation for happiness but seldom for sadness or anger, whereas 10 year olds gave belief/desire based explanations for all the emotions. This indicates that children gradually develop an understanding of belief-based emotions.

Finally, children develop an understanding that people do not always exhibit the emotions they are actually feeling. For example, Gross and Harris (1988) told children stories where the protagonist would either have a reason to hide (discrepant condition) or to show (non-discrepant condition) his/her emotion to other story characters. The findings indicated that the 6 year olds were more accurate in judging the discrepancy in real and apparent emotion in the discrepant situation and offered more accurate justification for their responses than the 4 year olds. Developing an understanding of hidden emotions allows children to realize

that others can be misled by the display of an emotion. In other words, the display of an unreal emotion allows one to create a false belief in another person (Gross and Harris 1988; Harris 1989; Jones, et al. 1998).

2.2.5 Age of ToM Acquisition

A controversial issue in ToM research is the age at which a child acquires ToM ability. There are two different perspectives on this issue. One, that the children acquire ToM ability around 4 years of age, and two, that the ToM ability is innate or inborn and even infants exhibit some evidence of ToM ability. A number of studies have suggested that there is a fundamental change in understanding of another's perspective at about 4 years of age (Flavell et al. 1990; Gopnik 1993; Bartsch and Wellman 1995). A meta-analysis of 178 ToM studies revealed that children under 4 years of age performed significantly below chance on false belief tasks, whereas 4 year olds performed above chance (Wellman et al. 2001). Other researchers have contended that the ToM ability in young children is largely underestimated due to the complexity of the tasks (Siegal and Beattie 1991; Sullivan and Winner 1993). It has been suggested that passing any cognitive ability test requires two important factors: competence and performance (Wellman et al. 2001). Competence refers to conceptual understanding necessary for solving a problem. Performance on the other hand, refers to additional cognitive skills (such as memory, comprehension, attention etc.) required for solvings the problem (Wellman et al. 2001). It is argued that children fail these tasks not because they lack the conceptual competence but because the testing situation is too challenging, and that ToM tasks are inappropriately and unnecessarily taxing in their presentation in terms of language and the scenarios created (Siegal and Beattie 1991; Sullivan and Winner 1993). Certain manipulations of the tasks (such as framing the task as explicit deception) result in enhanced performance of children even younger than three years of age (Fodor 1992; Sullivan and Winner 1993). For example, Sullivan and Winner (1993) tested 3-4 years old children on a standard unexpected content task (Smarties task), and a trick version of the same task. In the trick version, the children were required to trick another person by switching the content of the Smarties box (thereby making the task more explicit).

The findings revealed that children performed better on the trickery version than the standard task. The conclusion drawn by the authors was that even 3 year olds could attribute mental states that are different from their own, however this ability is subtle and difficult to demonstrate (Sullivan and Winner 1993).

Some research has provided evidence of rudimentary ToM ability in 13-15 months old toddlers (Onishi and Baillargeon 2005; Surian et al. 2007). Onishi and Baillargeon (2005) used a nonverbal ToM task with 56 infants (14-15 months). The infants were tested on their ability to predict an actor's behaviour based on her/his true or false belief about the location of a toy. The infants were familiarized with a situation where an actor placed a toy in either a green or a yellow box and then returned to retrieve the toy. Later in a belief induction trial, the toy either moved from the green box in to the yellow box or remained in the green box and the actor either witnessed the change or was unaware of it. This resulted in the actor holding a true belief or a false belief about the location of the toy. It was predicted that if the infant expected the actor to look for the toy based on the actor's belief about its location rather than the actual location, then the infant should look longer when the expectation was violated. The results of the study supported their prediction and based on the findings of their research Onishi and Baillargeon (2005) concluded that 15 months old infants already had a ToM and realized that others act on the basis of their own beliefs (which may or may not be true).

2.2.6 Theories of ToM

The phrase 'theory of mind' depicts the ability to attribute mental states to the self and others. It was considered a theory because mental states are not directly observable; one speculates about it and makes predictions about the behaviour based on these speculations. However, not all theorists agree with this idea and at least three different theoretical positions have been proposed so far. The first theoretical orientation agrees with the idea of ToM being theoretical and postulates that people have ideas about how beliefs, desires and perceptions interact with each other and this allows them to predict the behaviour of other people. This theoretical position is known as 'theory theory'. The second theory known as 'simulation theory', argues that people understand others' mental states

by imagining themselves in other's place. We think about what we would do if we were in their situation and that is how we infer that other people have mental states and how these are related to their behaviours. The final theory refers to a mental module and claims that a specific neural structure is responsible for ToM processing; this perspective is known as 'modular theory'. The following section provides a detailed review of these theories.

2.2.6.1 Theory Theory

Earlier in this section a definition of ToM by David Premack and Guy Woodruff (1978) is quoted, which elucidates why Theory of Mind is called 'Theory' of Mind. The quotation is:

> "An individual has a theory of mind if he imputes mental states to himself and others. A system of inferences of this kind is properly viewed as a theory because such states are not directly observable, and the system can be used to make predictions about the behaviour of others." (p. 515)

This definition proposed an idea that is now known as 'Theory Theory'. The term 'Theory Theory' was introduced by philosopher Adam Morton (1980), to propose that our understanding of mind is based on a folk psychological theory that consists of a framework of ideas that are causally linked to each other and behaviour. The relationship of these ideas with each other and subsequent behaviour is governed by a set of laws and rules (Churchland 1990). Goldman (2012) describes this theory as a set of law-like generalizations that associate:

a) Observable inputs to certain mental states (e.g. a person who has been engaged in physical activity without drinking water tends to feel thirst)

b) Certain mental states to other mental states (e.g. an individual in pain would want to relieve that pain)

c) Mental states to observable outputs or behaviour (e.g. an angry person tends to frown)

Thus, attributing mental states to others consists of making inferences guided by such law-like generalizations (Goldman, 2012). Many developmental psychologists (such as Josef Perner, Alison Gopnik, Henry Wellman, and Andrew Meltzoff) have applied this theory to demonstrate that young children construct and

modify their thinking in a similar scientific manner and that they make transitions from simple theories to more complex ones. According to Perner (1991, 1995) at around 4 years of age children acquire what is known as a 'representational understanding of mind'. Prior to this they develop the ability to represent their immediate environment (including objects and individuals) during infancy. By the end of the first year they realize that objects are permanent and are able to represent the reality of their present environment. This is also known as primary representation (Doherty 2009). In the next couple of years, children acquire secondary representations that refer to the ability to represent nonpresent situations such as past/future and hypothetical situations such as pretence (Doherty 2009). For instance, at 12 months of age children fail at what is known as 'invisible displacement'. When presented with a ball that was hidden under a cup that was slid under a cloth and slid out again to reveal no ball inside it, the children will only search inside the cup and fail to conceive any other possible hiding places based on the past movement of the cup. They overcome this problem at around 18 months of age when they are able to represent the state of event in past (that the cup was under the cloth so the ball may be under the cloth) (Flavell et al. 1993). After the secondary representations, children acquire 'metarepresentation' which refers to 'representing the representational relation itself' (Pylyshyn 1978). According to Perner (1995), in order to understand belief children need to be able to represent that representations are representations. Representational understanding of mind (acquired at around 4 years of age) refers to the notion that children consider mental states as propositions that are represented and evaluated (as true or false) in their own and others' minds. It is crucial for a child to understand that propositions can be evaluated in order to predict behaviours based on false belief. Doherty (2009) suggests that to develop such an understanding the child needs to make a distinction between, A) the proposition and B) the state of reality according to which proposition is to be evaluated. In the case of a false belief it is vital to distinguish between the propositions and the pertinent state of reality because Sally's behaviour (looking for the marble in the green box) is not caused by reality but by her representation of reality.

The Theory Theory has been criticized for the developmental timeline its proponents have proposed and for the idea that children go through a conceptual change to master false belief understanding (Doherty 2009). Other researchers have demonstrated that manipulations in test conditions enable children to pass the FB test at three years of age. For instance studies have indicated that children younger than 4 years of age often reported that they had believed a Smarties tube contained pencils after they were shown the content of the tube even though they had stated “Smarties” before they had seen the content of the tube. However, Mitchell and Lacohee (1991) provided 3 year olds with a memory aid (they were asked to mail a picture into a postbox of what they thought was inside the tube before it was opened) by asking them ‘what did you think was in the box when you posted the picture’, and found that majority of the children gave the correct answer that is Smarties. In another instance, Zaitchik (1991) told children where the chocolate was in the Maxi task rather than showing them and found that they were able to give correct answer, reality was made less salient by telling and not showing the correct location of the chocolate. More compelling evidence against the timeline of Theory Theory comes from studies (detailed in previous section on page 21) that demonstrated a rudimentary ToM ability in 13-15 month old infants (Onishi and Baillargeon 2005; Surian et al. 2007). Other theorists have argued that children possess the conceptual understanding to pass FB tasks but have limitations in other domains such as executive functions (Carlson and Moses, 2001). A final criticism on Theory Theory of ToM concerns the idea that if young children are considered ‘little scientists’ constructing a theory, it is strange that they all come to the same theory at the same time. Goldman (2012) argues that the fact that all children converge on the same theory denies the crucial feature of diversity in professional sciences.

2.2.6.2 Simulation Theory

The proponents of Simulation Theory argue that one does not need a theory to predict another person’s behaviour; rather one can do so by using one’s own mental apparatus. It is possible to use one’s own mind to mimic the other person’s mind and thus determine what they have or will do (Goldman 2012). In other

words, we can form explanations and predictions of someone by imagining what we would do if we were in their position. A common example used to illustrate Simulation Theory is the Tees/Crane experiment (Kahneman and Tversky 1982). In the experiment, participants were read a story about Mr. Crane and Mr. Tees, who were both going to the airport to catch their flights to different destinations that were scheduled to leave the airport at the same time. However, they got stuck in the traffic and reached the airport 30 minutes after the scheduled departure time of their flights. The airport staff told Mr. Crane that his flight left on time whereas Mr. Tees′s flight was delayed and left just five minutes ago. The participants were then asked the question, 'who do you think is more upset? The results of the experiment revealed that 96% subjects thought Mr. Tees would be more upset. It is argued that the participants in this experiment come to an answer by simulating or mimicking the situation of story characters.

Harris (1992) has proposed an account of how young children use simulation to attribute mental states to others. According to him children have two sets of 'default settings' that correspond to their own current mental states. The first set of default settings denotes the existing state of reality (how the child perceives it to be) whereas the second set represents the child's own mental states associated with reality. For instance, the first set of default settings would specify different snacks (carrots, sandwiches and cookies) available for lunch and the second set will specify that the child does not like carrots, thinks that the sandwiches are stale and wants to eat cookies. In order to assess another person's mental state a child needs to alter his/her default settings to match it with the other person's mental states. Children begin to alter their default settings with the use of pretence. In cases of 'pretence' children modify their default settings that are associated with current reality (e.g. pretending that a banana is a telephone). By three years of age children are also capable of altering their mental states towards current reality. In both these cases just one set of default setting is being altered. FB tasks on the other hand require altering two sets of default settings. In order to pass a FB task they need to alter the default settings for reality (the marble is in the green box instead of red where it actually is) as well as the settings for

mental states (Sally had a different belief than the child's). Harris (1992) argues that younger children find FB tasks difficult because they are unable to switch two sets of their default settings. However, at around 4 years of age children can successfully alter both sets of default setting and can therefore pass the FB task.

One concern about Simulation Theory is that it also involves some level of theorizing and thus may collapse into Theory Theory. Doherty (2009) argues that in cases where false belief is acquired during the process of events, it is possible to introspect on our own hypothetical mental states via simulation and attribute them to the other person but not in cases where considerable differences exist in the beginning of the simulation. For instance, in Sally-Anne task Sally puts the marble in green box, the child can alter his/her belief state to match that of Sally's. Then the child can imagine Sally going out to play and not seeing the marble being moved to red box. In this case the child can simulate Sally's belief state, and attribute to her the belief that the marble is in green box. On the other hand, in the Smarties task the child must realize that the other person is ignorant of the contents of tubes before the simulation begins. This state of ignorance cannot be inferred by simulation, rather requires some level of theory-like reasoning (because the person did not look inside the tube therefore he/she is ignorant of the contents of the tube). Doherty (2009) argues that the more complicated ToM reasoning can require considerable initial adjustment of default settings and therefore some theoretical knowledge seems essential to get simulations started.

Furthermore, it has been suggested that simulation does not seem to work in certain cases. For example, in case of visual perspective taking, simulation does not help figure out the perspective of a viewer from another side of the object (Perner 1991). One cannot speculate about the visual perspective of another person by focusing on one's own perspective. Neither can one guess what the other person's perspective would be by imagining one's self standing in their position. Similarly, it is not possible to judge the knowledge/ignorance state of another person by mere simulation. Doherty (2009) gives example of a case where someone looks inside the box to find out the contents. If we ourselves are unaware

of the content of the box, then we cannot figure out the other person's knowledge of contents in the box just by simulating.

2.2.6.3 Modular Theory

Modular theory posits that a specific part of the brain is responsible for ToM reasoning. The proponents of Modular Theory suggest that Children's concepts of mental states (such as desire, belief and emotions) are not an abstract theory rather these are processed by a specific set of neural circuits (Leslie 1994). These domain-specific neural structures are often referred to as 'modules'. It is believed that different modules have been developed through the process of evolution and that they become functional once the appropriate neural maturation has been acquired (Leslie 1994; Scholl and Leslie 1999). Modular Theory is nativist in that it considers the core concepts like belief and desire as innate. In other words, ToM is a part of our genetic makeup and is triggered by appropriate environmental factors just like puberty is triggered and not learned (Scholl and Leslie 2001).

The idea of mental modules gained popularity with a publication of Jerry Fodor's book in 1983 titled 'Modules of Mind'. Fodor (1983) suggested that modules have following specific properties:

1. Domain specificity: modules are specialized systems that only receive specific sort of inputs and generate specific outputs
2. Informational encapsulation: modules do not get assistance from other psychological systems in order to operate and the rest of the system does not have have access to the processes of the module.
3. Obligatory: the operation of the modules is mandatory which means that one cannot help but behave in accordance with the functioning of the system
4. Speed: operations of the modules are fast, most probably due to the fact that they are encapsulated and mandatory.
5. Shallow outputs: this indicates that the output of modules is restricted to very simple or low level concepts

6. Specific ontogeny: modules exhibit specific and regular characteristics and paths of development
7. Specific breakdown patterns: modules also demonstrate characteristic and specific patterns of defect or malfunctioning

The initial support for modular theories came from the studies that investigated mental state understanding in children with autism (Baron-Cohen et al. 1985; Baron-Cohen et al. 1986). In one study, Baron-Cohen et al. (1985) tested three groups of children (normal pre-schoolers, children with Down syndrome, and children with autism) who had a mental age of above 4 years, on a false-belief task. The findings of their study revealed that only 20% children with autism passed the tests, compared to 85% of the normal and 86% of the Down syndrome children. In another study (Baron-Cohen et al., 1986), children with autism were compared with Down's syndrome and clinically normal preschool children on a picture-sequencing task. The pictures (that were presented in a jumbled manner) were to be organized to make a coherent story. There were three types of stories: mechanical, behavioural and intentional. The findings indicated that on mechanical and behavioural stories the autistic children performed as well as the other two groups of children and indeed often showed superior performance. However, on the intentional or mental state stories the autistic children performed much worse than the others did. Furthermore, while narrating the stories the autistic children were able to use causal and behavioural language but rarely used mental state language. The investigators concluded that autism impairs a domain-specific ability dedicated to mental state understanding.

In sum, Theory Theory posits that one attributes mental states in a theory-like fashion by making inferences guided by law-like generalizations. Simulation Theory suggests that one can use their own mind to mimic the other person’s mind in order to determine their mental states. The modular Theory on the other hand proposes that a specific part of brain is responsible for ToM reasoning. Doherty (2009) argues against the assumption that one of the theories must be correct and the others incorrect. Instead he suggests that all theories have some elements of truth, the question is which part of ToM are best described by each theory. It is

plausible that one understands false belief in a theoretical manner and emotions through simulations. These process may be executed in a specialized brain area that has the characteristics suggested by Modular theorists (Doherty 2009). Thus, all the theories have potentially strong elements for explaining ToM processes.

2.2.7 Sources of Variability in ToM

As mentioned in the earlier sections, ToM is the ability to attribute mental states to self and others and to understand how these mental states are linked to our everyday behaviours. It is reasonable to think that this ability would vary among individuals like any other cognitive ability. The research investigating ToM in children has explored many social factors (such as parent-child interactions, number of siblings etc.) that can possibly be linked to ToM development. The following section explores these sources of variability in children's understanding of their own and other's minds.

Parent-child interactions: It has been suggested that individual differences in ToM ability among children can be linked to familial factors such as family size, parenting strategies and language used in every day conversations (Brown et al.1996; Ruffman et al.1999). The research on parenting styles' relation to ToM has indicated that parenting styles associated with negative control strategies (criticism, yelling, spanking etc.) and low levels of warmth and responsiveness have a negative effect on ToM development in young children. On the contrary, parenting styles characterized by high levels of warmth and responsiveness and positive control strategies (such as using rewards to control behaviours and providing explanations for rules) have been associated with more advanced ToM in children (Hughes, et al. 1999; Pears and Moses 2003). An investigation of parenting styles and ToM among Anglo-Australian children (aged 5–12) indicated that children's mental state understanding had a negative relation with authoritarian parenting (characterized by high levels of demanding and low levels of responsiveness) and a positive relation with authoritative parenting styles (associated with less punitive strategies for control combined with high levels of warmth).

It has also been argued that the more the children are exposed to mental state words in everyday conversations the sooner they develop an understanding of mind (Garner et al. 1997; Turnbull and Carpendale 1999; Ruffman et al. 2002; Adrian et al. 2007). For instance, parental mental state discourse during joint reading activity with the child, was related to false belief understanding of the child (Symons et al. 2005). Similarly, children whose mothers explained the causes and consequences of emotions performed better on emotional understanding tasks than children of mothers who made fewer references to emotions (Garner et al. 1997). In a longitudinal study Ruffman et al. (2002) found that mother's use of mental state words at an earlier time point was correlated with later mental state understanding in children even after controlling for a number of potential mediators. Furthermore, it has been reported that mental state utterances of mothers predicted mental state understanding of children at a later age (Ruffman et al. 2006; Taumoepeau and Ruffman 2006; Taumoepeau and Ruffman 2008).

Furthermore, ToM has also been linked to maternal education (Pears and Moses 2003). It has been argued that maternal education can impact ToM by its association with general cognitive development of the child. Educated mothers have also been shown to offer more causal explanations for the social phenomenon than the uneducated mothers; which can directly influence the child's mental state understanding (Pears and Moses 2003). However most of the research relating parental factors to child's mental state understanding is carried out in Western cultures. It is uncertain if the interaction of parental variables with children's ToM ability would remain similar in cultures that differ from the Western society.

Siblings: Another factor that has been identified to influence ToM ability within the family is the number of siblings a child has. Initially Perner, Ruffman and Leekam (1994) found that children with at least two siblings performed better on ToM tasks when compared with children who had no siblings. Subsequent studies confirmed that the association between ToM understanding and number of siblings persisted even after controlling for other variables such as language ability (Jenkins and Astington 1996; Ruffman et al. 1998). An interesting finding that emerged from these studies was that children who had older siblings benefitted more than the firstborns (Ruffman

et al. 1998). It has been suggested that the younger children engage in interactions with a skilled partner (their older sibling) in play and have opportunities to witness their older siblings interact with others, which might help advance their ToM skills (Hughes and Leekam 2004). The firstborns on the other hand did not have these opportunities to polish their skills. Similarly, 'only-children' have been found to be at a disadvantage for understanding of mental states (Lewis et al. 1996). However, when the families that were large because of other live-in kin (such as aunts, uncles, cousins) were compared with those that had a larger number of siblings, factors such as child's age, availability and interaction with adults also appeared to be significant correlates of ToM (Lewis et al. 1996). Based on these findings Lewis et al. (1996) suggested that ToM is not simply transferred from one sibling to another; rather the young children benefit more from interaction with a variety of knowledgeable members of all ages in their household.

Furthermore, the association of mental understanding in young children with number of siblings also varies with the chronological age of the siblings. In a study of 3-5 year-olds, Peterson (2000) found that the children whose siblings were either an infant, a teenager or an adult, performed no better than children without siblings did. However, children who had sibling within the age range of 1-12 years scored significantly higher on FB tasks. This could perhaps be due to the fact that the teenage and adult siblings' mode of interaction with a preschooler does not differ much from the parents and lacks the elements that interactions with another child would have. Similarly, infant siblings do not provide any stimulation for understanding mental states. In a study that compared 3-5 year old twins, children with non-twin siblings and only-children, revealed that the ToM ability of children with non-twin sibling was more advanced than both only-children and twins with no other siblings (Cassidy et al. 2005). In addition, twins with other siblings outperformed twins without any siblings. The findings also revealed that children with at least 1 opposite-sex sibling performed better than children with only same-sex siblings. The authors suggested that it is not just the presence of another child that accounts for ToM benefit, rather it is the diversity of perspectives in sibling interactions that allows the child to advance his/her ToM reasoning (Cassidy et al. 2005).

Culture: As mentioned above, the ability to read others' mental states is associated with family size and the quality of interactions with parents and siblings. These factors vary in different cultures and therefore, it is reasonable to think that these and other cultural differences could influence the mental state understanding of young children. So far the research on mental state understanding has been predominately limited to Western American and European cultures (Wellman 2012; Wellman et al. 2001). In recent years, however, researchers have started to investigate cultural differences in the acquisition of mental state understanding (Tardif and Wellman, 2000; Callaghan et al., 2005; Liu et al. 2008; Lecce and Hughes 2010). One of the earlier studies that investigated mental state understanding across five cultures (Canada, India, Peru, Samoa and Thailand) revealed that children from all cultures passed false-belief tasks around 5 years of age (Callaghan et al. 2005). The findings of this cross-cultural study suggested a strong influence of biological maturational processes rather than cultural variations on ToM development. Later studies, however, found variations in the time and sequence of ToM acquisition in different cultures. For instance, a meta-analysis revealed that the children from Canada and Australia outperformed their counterparts from the US and the UK on false-belief understanding (Wellman et al. 2001). In addition children from US and UK performed better than children from Austria and Japan (Wellman et al. 2001). Likewise, another study reported a delay of up to two years in ToM acquisition in Chinese children, when compared with their counterparts from North America (Liu et al. 2008).

In an attempt to explain cultural variations in mental state understanding researchers have referred to general distinctions between collectivist and individualist cultures (Wellman and Liu 2004; Mayer and Trauble 2013). It has been suggested that mental state understanding is influenced by cultural norms and attitudes (Ames et al. 2001). In general, the individualist cultures promote independence and autonomy, whereas the collectivist cultures value conformity and obedience resulting in interdependence (Greenfield and Suzuki 1998). Such differences in the desired outcomes of development could possibly account for the

variation in ToM understanding in different cultures (Mayer and Trauble 2013). Such an explanation however, fails to cater for the differences within similar cultures. Variations in mental state understanding have also been reported within collectivist cultures such as Mainland China and Hong Kong, as well as within individualist cultures such as Britain and Italy (Liu et al. 2008; Lecce and Hughes 2010). Explanations based on more specific cultural differences (such as conversational style or children's pedagogical experiences) have been proposed to cater for the differences in ToM understanding in similar cultures (Lecce and Hughes 2010; Hughes et al. 2014). However, further exploration is needed to determine the factors accountable for cultural variations in mental state understanding.

2.3 Executive Functions

Executive functioning (EF) is usually defined as a set of higher-order, self-regulatory cognitive processes that facilitate goal-directed behaviour by monitoring and controlling thought and action (Hughes 1998; Perner and Lang 1999; Carlson and Moses 2001; Carlson et al. 2002). The EF processes are involved in all aspects of one's life and are essential for mental and physical health as well as success in different fields of life. Impairments in EF have been associated with several mental disorders including Attention Deficit Hyperactivity Disorder, conduct disorder, Obsessive Compulsive Disorder, Schizophrenia and depression (Barch 2005; Diamond 2005; Lui and Tannock 2007; Penad´es et al. 2007; Taylor-Tavares et al. 2007; Fairchild et al. 2009). In terms of physical health Poorer EFs were linked to obesity, overeating, substance abuse, and poor treatment adherence (Riggs et al. 2010; Crescioni et al. 2011; Miller et al. 2011). Furthermore, better EF skills have been associated with better quality of life, school readiness and success, job success and marital harmony (Eakin et al. 2004; Gathercole et al. 2004; Bailey 2007; Blair and Razza 2007; Duncan et al. 2007; Borella et al. 2010; Brown and Landgraf 2010; Davis et al. 2010; Morrison et al. 2010).

EF is a multifaceted concept that includes several components such as planning, self-regulation, behavioural organization, inhibitory control, error detection and correction, set shifting (cognitive flexibility), and working memory (Luria 1973; Goldberg and Bilder 1987; Carlson and Moses 2001; Blair, et al. 2005; Diamond 2006). However, there is a general agreement that there are three core EF skills; inhibition control, working memory and cognitive flexibility (Miyake et al. 2000; Diamond 2013). Inhibitory control denotes the ability to withhold a strong internal predisposition in order to do what is more appropriate (Diamond 2013). Working memory is the skill that enables one to hold information in mind and to manipulate that information mentally (Davidson et al. 2006). Cognitive flexibility involves the ability to change perspectives and the flexibility to adjust to new demands or rules (Diamond 2013). Although EF skills may emerge as early as infancy but they develop most rapidly during the preschool years and continue to do so during adolescence (Diamond 2006; Zelazo and Carlson 2012). It has been suggested that young children and older adults tend to exercise EFs reactively, i.e. in response to environmental demands. On the other hand, older children and young adults use EF proactively, i.e. in a more planned and anticipatory manner (Czernochowski et al. 2010; Munakata et al. 2012; Diamond 2013).

2.3.1 ToM and EF

A wealth of empirical evidence indicating a strong link between EF skills and mental state understanding has accumulated over the past two decades (Perner and Lang 2000; Moses 2001). Researchers have identified several commonalities between the two that may account for the strong association reported between ToM and EF. For example, it has been reported that both ToM and EF are quite active in the prefrontal cortex and share similar neural processes (Sabbagh and Taylor 2000; Rowe et al. 2001; Carlson et al. 2004). They also share a similar developmental trajectory in that both develop rapidly during preschool years and the associations reported between ToM and EF have been consistent across age and culture (Chasiotis et al. 2006; Sabbagh et al. 2006; Henning et al. 2011; Bock et. al. 2014; Evren and Yagmurlu 2014; Wang et al. 2016). Furthermore, deficiencies of both ToM and EF have been reported in clinical populations (such

as individuals with Autism) (Baron-Cohen 1995; Carlson and Moses 2004; Carlson et al. 2004). It has also been suggested that ToM tasks put similar demands on EF in that they require inhibiting one's own knowledge of the true state of reality and report from a naïve perspective (Marcovitch et al. 2015). For example in the classic location change false belief task the child knows that the location of the marble has been changed but needs to suppress his/her own knowledge in order to successfully represent the mental state or false belief of the character. The following paragraphs present a review of studies investigating the link between ToM and EF in different age groups and cultures.

It has been suggested that some aspects of EF relate more strongly to ToM than others (Carlson and Moses 2001; Carlson et al. 2002). For instance, Carlson, et al. (2004) investigated links between ToM and two aspects of EF; inhibition control (IC) and planning ability. They tested 49 children between 3 and 4 years of ages on 2 tasks of ToM (appearance-reality and false belief), 3 tasks of IC (Bear/Dragon, Whisper, and Gift Delay) and three tasks of planning ability (Tower of Hanoi, Truck Loading, and Kitten Delivery). The findings of their study indicated that two IC tasks (Bear/Dragon and Whisper) were significantly related to theory of mind after controlling for the effect of age, receptive vocabulary, and planning. However, the planning tasks did not significantly relate to ToM. Similarly, Carlson and Moses (2001) tested 3 and 4 year olds on a multitask battery of inhibition control (IC) and ToM and found that inhibitory control was strongly related to ToM after controlling for a number of variables such as age, gender, verbal ability, family size etc. Furthermore, on the basis of a principle component analysis Carlson and Moses (2001) identified two separate facets of IC; delay IC (the ability to inhibit a response for a period of time) and conflict IC (the ability to inhibit a dominant response to allow a conflicting response). A commonly used delay IC task is 'Gift Delay Task' which requires the chid to not look at a gift while the experimenter wraps it for him/her (Kochanska and Knaack 2003). The 'Day/Night' task is often used to measure conflict IC, it requires the child to say day when he/she is shown the picture of moon (representing night) and to say night when shown a picture of sun (representing day). Although both delay IC and conflict IC

tasks are significantly related to ToM performance, conflict IC is more strongly correlated and IC has been found to significantly predict ToM performance over and above delay IC (Carlson and Moses 2001; Carlson et al. 2002). It has been suggested that conflict IC is strongly related to ToM due to the demands of ToM tasks. In most ToM tasks children are required to inhibit a stronger/dominant response (e.g. their own knowledge of reality) but to report a conflicting response that represents another person's perspective (Carlson and Moses 2001; Carlson et al. 2002).

Majority of the studies investigating the association between ToM and EF have focused on preschool children because it is largely believed that both the skills go through critical developmental changes in these years. For example Henning et al. (2011) tested 195 children between 3-6 years of age on tasks of EF and ToM and reported a significant correlation between ToM and EF after controlling for the effect of age, verbal ability, child temperament and parental age. In a longitudinal study, Muller et al. (2012) assessed 82 pre-schoolers at 2, 3, and 4 years of age on various tasks of ToM and EF. The results of the study revealed a significant relation between EF and ToM at 3 and 4 years of age after controlling for the effect of age, verbal ability, and sex but not at 2 years of age. Although few in number, the studies investigating older children have also yielded similar results. A longitudinal study examined the relationship between three components of EF (attention shifting, inhibition and working memory) and ToM in 6-11 years old children at two time points with a gap of one year (Austin et al. 2014). According to the findings of this study the relationship between ToM and all the components of EF remained consistent at both time points even after controlling for the effect of age, gender and fluid intelligence. Similar associations have also been reported for 7-12 year olds (Bock et al. 2014). The association between ToM and EF remained consistent across various cultural groups. For instance Chasiotis et al. (2006) tested pre-schoolers from Germany, Costa Rica and Cameroon, on measures of false-belief and inhibitory control. They found a culture-independent relationship between conflict inhibition and false-belief understanding after controlling for the effect of age, gender, language, siblings and mother's education. In another study

EF was found to be a significant predictor of ToM among institution-reared Turkish children (Evren and Yagmurlu, 2014). Sabagh et al. (2006) compared the performance of Chinese pre-schoolers with a previously studied sample of US pre-schoolers on measures of EF and ToM and found that EF predicted ToM in both cultures. Similarly, Wang et al. (2016) investigated the link between ToM and EF in Japanese and British children and found a robust link between the two in both cultural groups. Thus the findings from different age groups and cultures provide sturdy evidence for a strong link between ToM and EF.

Some theorists propose that there is a causal relationship between ToM and EF (Perner and Lang 1999; Moses and Tahiroglu 2010). The evidence for a causal relationship comes from the studies that revealed that training on a false belief task improved performance on a task of EF, Dimension Change Card Sort (DCCS), and that training on the DCCS improved false belief performance (Kloo and Perner 2003). These findings demonstrate that progress of skills in one domain can improve the other, however, it does not indicate which domain has developmental precedence. There is a possibility that developments in ToM result in improvements in EF or vice versa. In favour of the first hypothesis i.e. ToM leads to improvements in EF, researchers argue that growing sophistication of mental concepts, allows children to control mental processes more efficiently (Wimmer 1989; Perner and lang 1999). Furthermore, skills acquired by a developing ToM such as the ability to represent goal states, are essential for EF (Perner 1998). On the other hand, in support of the argument that improvements in EF lead to developments in ToM, researchers argue that limitations in ToM concepts stem from deficiencies in EF, specifically inhibition control (Russell 1996; Carlson and Moses 2001). Furthermore, it has been suggested that maturation of EF, specifically inhibition and working memory, is essential for the emergence of ToM skills (Carlson and Moses 2001; Moses and Tahiroglu 2010).

Some evidence for the above mentioned theoretical debate comes from the longitudinal studies examining the relation between EF and ToM. Two longitudinal studies found support for the hypothesis that earlier ToM predicts later EF. McAlister and Peterson (2013) tested 157 children, first between 3 to 5 years of

age and later after 12 months on ToM and EF tasks. They found that time 1 ToM scores predicted time 2 EF scores over and above the effects of age, language skill, and number of siblings. However, EF at time 1 did not emerge as significant predictor of ToM at time 2. Austin, Groppe and Elsner (2014), tested older children (between 6-11 years of age) at two time points with a gap of one year and found a partial support for the assumption that early ToM predicted later EF, however, the evidence for early EF predicting later ToM was stronger. Other longitudinal studies provide support for the assumption that EF has developmental precedence over ToM. For instance, Muller, et al. (2012) assessed pre-schoolers at 2, 3, and 4 years of age on tasks of ToM and EF. The findings revealed that EF at age 2 and 3 predicted ToM at age 3 and 4 respectively but ToM at ages 2 and 3 did not predict EF at age 4. Similarly, Carlson et al. (2004) tested 81 children at 24 and 39 months of age on a tasks of ToM and EF and found that EF at 24 months predicted ToM at 39 months but not the other way round. In another longitudinal study Hughes (1998) tested 50 children (between 39 and 55 months of age) at two time points with a gap of 13 months and found that early EF predicted later ToM skills but not vice versa. Hughes and Ensor (2007) also reported similar results when children were assessed at 2, 3, and 4 years of age. EF at 2 and 3 years predicted later ToM at 3 to 4 years but ToM did not predict EF from 2 to 3 or from 3 to 4 years of age. In yet another longitudinal study, Marcovitch et al. (2015) examined 226 slightly older children, at 3, 4 and 5 years of age on a variety of EF and ToM tasks. Their results were consistent with previous studies that EF at 3 and 4 years predicted ToM at 4 and 5 years, however earlier ToM did not appear as a significant predictor of later EF at any time point.

Another debate regarding this link focuses on how EF influence the ability to understand mental states. It has been suggested that EF can influence ToM in two possible ways, either by facilitating the expression of an already existing ToM skill, or by providing prerequisites for the emergence of ToM (Russell 1996). The expression account of this link argue that children fail ToM tasks because of the demnads these tasks put on EF and not due to a lack in ToM ability. For example, FB tasks requires the child to inhibit his/her own knowledge of true state of events

in order to be able to report the mental state of the protagonist. Younger children fail the task due the lack of EF skills such as inhibition control required for the task. Children with higher EF abilities, therefore, will be able to perform better on ToM tasks. On the other hand, the emergence account proposes that that EF is a prerequisite for acquiring mental state understanding. The proponents of this account argue that a certain level of executive ability must exist to enable a child to construct mental representations in the first place.

Finally, Devine and Hughes (2014) drew three important conclusions based on the findings from a meta-analytic review of 102 studies investigating links between ToM and EF. Firstly, they revealed that the association between EF and one key component of ToM i.e. false belief understanding is similar for children from various cultures. Secondly, this association is largely consistent across different EF tasks but varies across several types of false belief tasks. And finally, they indicated that early individual differences in EF predicted later variations in false belief understanding but not the other way round. Based on the findings on above-mentioned studies it appears that the evidence supporting developmental precedence of EF is stronger than that of ToM. However, further research is needed to identify the specific developmental pathways between various aspects of EF and ToM.

2.4 Social Competence

Social competence is a multidimensional construct that encompasses different social, cognitive and emotional skills, which are crucial for effective social adaptation (Semrud-Clikeman 2007). Defining social competence however, has proved to be a difficult task given the complexity of behaviours and diversity of skills involved. A central aspect in most of the definitions is identified as effectiveness in social interaction. For instance, Duck (1989) defined social competence as an ability to achieve desired outcomes and show adaptability across different settings. Howes (1987) proposed that social competence refers to behaviours that reflect successful social functioning. A more elaborate definition has been proposed by Rose-Krasnor who referred to social competence as:

"The ability to achieve personal goals in social interaction while simultaneously maintaining positive relationships with others over time and across settings". (p.285)

In other words socially competent behaviours allow us to accomplish our desired obkjectives in life and successfully adapt to different social situations. However, merely achieving the goals is not enough for being socially competent. A very crucial part of social competence is creating and maintaining healthy relationships. Given the complexity of the construct itself, assessment of social competence has also proved to be a challenge. The next section includes the review of four approaches that have been largely used for assessment of socially competent behaviours.

2.4.1 Approaches to Social Competence

Rose-Krasnor (1997) suggested four specific approaches used to assess social success. These approaches include assessment of specific skills, sociometric status, relationships and functional outcomes. These approaches are further discussed below.

2.4.1.1 Social skills approach:

According to this approach social competence is defined as a set of socially desirable skills (Cavell 1990; Hubbard and Coie 1994). The major strength of this approach is that it allows generating lists of targeted behaviours that provide sound basis for assessment (Rose-Krasnor 1997). However, identifying the behaviours that constitute social competence has proved to be a challenging task. Researchers have used several strategies for selection of socially competent behaviours; such as social values strategy, competence correlates strategy, and a normative strategy. The social values strategy targets the behaviours that are valued by different social agents such as teachers, peers and parents (Dodge and Murphy 1984). Hughes (1990) proposed a 'social validity' approach in which social skills were defined as those behaviours that were identified as competent by teachers and peers. Similarly, Waters et al. (1985) used a Q-sort methodology and asked 35 psychologists to describe a socially competent child. Consequently several attributes (such as helpful, self-assertive, empathetic etc.) were identified

as indicators of socially competent behaviour. However, this approach has been criticized for its arbitrary nature and culture bias (Dodge 1985; Hubbard and Coie 1994).

In competence correlates strategy, behaviours are selected based on correlation with other indicators of social competence (Rose-Krasnor 1997). Peer popularity has been the most frequently used criterion for this purpose and several behaviours such as smiling, friendliness, and co-operation have been identified via this strategy. However, the correlation between peer popularity and the behaviours identified as competent, is only low to moderate, which poses a major difficulty to this strategy (Parker and Asher 1987). The normative strategy uses group norms to identify socially competent behaviours. For example, age and class norms have been used to identify socially competent children (Rubin 1982). The major problem with this approach is that it defines competence based on the views of majority and fails to consider potentially optimal behaviours (Rose-Krasnor 1997). Furthermore, this strategy is unfavourable specifically for dysfunctional peer groups where normative behaviours may have adverse consequences (Cairns and Cairns 1994).

Although social skills approach has provided a good basis for generating assessment checklists, it also has several drawbacks (Rose-Krasnor 1997). Firstly, the use of different strategies for identifying competent behaviours has led to disagreements on indicators of competence (Hops and Finck 1985). Secondly, this approach considers social competence as individual trait or ability rather than an outcome of interactions between individual and his/her environmental settings (Rose-Krasnor 1997). Thirdly, it has been criticized for conceptualizing competence as a set of predefined skills (Dodge and Murphy 1984). It has been argued that similar acts may serve various functions for different individuals and under different circumstances. Finally, the approach has been criticized for the risk to miss the larger picture by focusing only on individual behaviours or skills. In other words, certain behaviours may appear competent when viewed independently but might not have favourable outcomes if the child is unable to integrate and sequence them appropriately (Waters and Sroufe 1983; Furman 1984).

2.4.1.2 Peer status approach:

This approach focuses on popularity in peer group as an indicator of social competence (Dodge 1985; Stump et al. 2009). The more a child is popular in his/her group of peers, the more he/she is socially competent. The emphasis on the child's position in the group is based on Jacob Moreno's (1934) proposition that behaviour can only be understood in terms of social framework and the group in which individuals function (Hymel et al. 2002). The most widely used method for assessment of peer popularity is 'socimetric status' (Hymel et al., 2002). Sociometric status depicts the position of an individual in a group, determined by measuring interpersonal attraction among members of the group. Positive peer evaluations indicate popularity or acceptance while the negative peer evaluations indicate alienation or rejection from the members of the group. The most widely used sociometric evaluation procedures are nominations and rating methods. In nomination method, the participants are required to choose group members according to a specified criteria. In the nomination method participants are asked to categorize group members based on specified positive (liked) or negative (not liked) criteria. In order to facilitate memory, children are usually provided with a list of the group members' names or (in the case of younger children) pictures. The number or proportion of positive nominations received provides an index of attraction or acceptance whereas the number or proportion of negative nominations received provides an index of repulsion or rejection within the group. In the ratings method, participants rate other group members on specified sociometric criteria (Hymel, et al. 2002).

The major strength of this approach is that it provides the combined judgment of peers and shows good temporal stability (Coie and Dodge 1983; Ollendick et al. 1985; Denham et al. 1990). In addition, the sociometric status is also correlated with other indicators of competence (Newcomb et al. 1993; Parker et al. 1995). For instance, childhood popularity has been associated with higher levels of pro-social behaviours, social problem solving and communication skills (Coie, et al. 1990; Dodge and Feldman 1990). On the contrary, rejection has been

associated with an increased risk for externalizing problems such as poor school adjustment, disruptiveness and physical aggression, as well as internalizing problems such as feelings of loneliness, social anxiety, and depression (Parker and Asher 1987; Kupersmidt and Coie 1990; Newcomb et al. 1993; Rubin et al. 1998; Buhs and Ladd 2001; Schaeffer et al. 2003).

2.4.1.3 Relationship approach:

According to this approach competence is indicated by the quality of relationships a child forms (Rose-Krasnor 1997). The quality of any relationship depends on both partners and this transactional aspect of relationship approach is consistent with Vygotsky's (1978) notion of scaffolding. A child may exhibit higher cognitive abilities while interacting with a socially skilled partner as compared to the abilities reflected during his/her interaction with a less skilled partner. It is argued that in horizontal relationships (interaction with peers) the social skills of both partners are reflected in rather equal amounts while in vertical relationships (those with more skilled partners e.g. a parent) the skills of more powerful partner are reflected to a higher extent than the skills of the child (Rose-Krasnor 1997). For instance, in studies of infants the quality of attachment is usually attributed to parent's responsiveness, while the infant's role is often limited to certain child characteristics such as temperament (Ainsworth, et al. 1978; Goldsmith and Alensky1987). It has also been suggested that parental responsiveness and sensitivity to the needs of infant may be considered an indicator of the infant's own success (Attili 1989). With development however, the social skills of a child may also play an important role in forming and maintaining attachment in relationships. Crittenden (1992) described the differences in strategies used by secure and insecure children to evoke supportive responses from caregivers. Secure children use open negotiations and express their emotions to meet their needs while insecure children may use threats, bribes or inappropriate emotional displays. Children will also use these skills in forming relationships with individuals outside the family. As the nature of relationship becomes more horizontal, the contribution of such skills of children towards the relationship increases (Rose-Krasnor 1997).

Thus the quality of a child's attachment to significant others as well as the nature of friendships formed, may be considered indicators of his/her competence (Howes 1987).

The importance and benefits of friendships for development have been widely recognized (Newcomb and Bagwell 1995). Friends impart to each other feelings of affection, support, companionship along with providing information and instrumental aid. Friendships may also provide many opportunities for learning and enhancing the social skills of both partners and children without friends miss many social experiences in everyday life (Rose-Krasnor 1997). For instance, number of friends has been positively correlated with socio-emotional and economic adjustment (Vandell and Henbree 1994) and children without friends reported more loneliness than children with friends (Parker and Asher 1993). In addition, the quality of friendship may also be an important contributing factor. Friendship quality was related negatively to loneliness independent of peer acceptance and number of friends (Parker and Asher 1993). In addition, friendships of antisocial boys were reported to be of lower quality and shorter duration than those of less aggressive boys (Dishion et al. 1995). However there are potential as well as methodological difficulties with friendship measures of social competence. Methodologically, there is little agreement on the definition of friendship (Hartup 1992; Parker et al. 1995). Moreover, the friendships of older children are based upon loyalty and intimacy so they are may be careful not to betray confidences by reporting interactions with a friend (Rose-Krasnor 1997). Finally, some children may experience negative influences in friendship and therefore, friendships cannot always be associated with positive developmental outcomes (Cairns et al. 1988; Hartup, 1996).

2.4.1.4 Functional approach:

This approach focuses on the outcomes of social behaviours (Rose-Kransor 1997). The functional approach has been described as context specific, concerned with identification of social goals and consistent with ethological, social problem solving and systems theories (Ford and Ford 1987; Attili 1990; Rubin and Rose-Krasnor 1992). The functional approach has been credited with the development of

process models of competence, which incorporate many components of social skills (Rose-Krasnor 1997). For instance, information-processing models of social skills involve a multistep socio-cognitive process (Dodge 1986; Rubin and Rose-Kosner 1986). In the process a social goal is selected, environment is monitored, a strategy is selected, the strategy is implemented, its outcome is evaluated and a subsequent action is decided on (Rose-Krasnor 1997). The skills used at each step of the process as well as the capacity to integrate the steps into a smooth sequence, make important contributions to the social competence of a child (Dodge et al. 1986; Krasnor 1988). Empirical evidence indicates a positive correlation between children's performance in each step and social competence (Dodge and Price 1994). In addition it has also been reported that aggressive and non-aggressive children differ at each step of the process (Dodge et al. 1986).

Another contribution of functional approach is to emphasize children's social goals and outcomes, although the research in this area is limited (Rose-Krasnor 1997). For instance, it has been reported that adult and peer judgments of effectiveness of social behaviour correlate positively with social problem solving skills, empathy and social support (Ford 1982; Dodge et al. 1986). In addition, children may also differ in the importance they associate with social and non-social goals. Adolescents who valued social goals more than non-social ones were rated as more socially effective compared to those who value non-social goals more (Ford 1982). Furthermore, the rejected children were found to associate less importance to relationship goals and more to individualistic goals compared to popular children (Crick and Ladd 1990; Rabinet and Gordon 1992). There are however, many potential problems in functional approach such as methodological and theoretical challenges in determination of success and failure (Rose-Krasnor 1997). Outcome judgements are only predicted in context of specific goals, which might be a disadvantage for an individual having multiple and potentially conflicting goals in the same situation (Rose-Krasnor 1997). Furthermore, it is difficult to determine an optimal amount of success and observed success is not always related to other criteria of social competence (Rose-Krasnor 1997). For instance,

aggressive children were reported to have relatively higher success rates (Booth et al. 1991) while withdrawn children were less successful (Stewart and Rubin 1995).

2.4.2 ToM and Social Competence

In recent years researchers have focused on identifying the links between mental state understanding and indices of social competence. It can be postulated that the ability to understand others' mental states will facilitate one to react more appropriately in various social situations resulting in a more competitive social behaviour. Most of the studies investigating the link between mental state understanding and social competence have used either social skills approach or peer status approach to measure social competence. Generally a positive direction of relationship between social competence and ToM has often been reported in literature although there are quite a few exceptions (Badenes et al. 2000; Capage and Watson 2001; Charman and Campbell 2002; Cassidy et al. 2003; Etel and Yagmurlu 2014). For instance, Keskin (2005) investigated the link between ToM and social competence (measured through Social Skills Rating Scale) and found no significant associations between children's performance on ToM measures and social competence. Similarly, no significant associations were found between ToM understanding and teachers' reports of social competence among children and adolescents with mental handicaps and institution-reared children (Frith et al. 1994; Charman and Campbell 2002; Etel and Yagmurlu 2014). Other studies that investigated social competence in terms of peer popularity have also yielded mixed findings. For example, Badenes et al. (2000) found no differences in performance of 4-6 year old peer-rejected, popular and average children on ToM measures (false belief and deception tasks). Watson et al. (1999) used teacher's ratings of popularity rather than peer ratings, and found no correlation between ToM and teacher's ratings of popularity.

Contrary to the above-mentioned studies, others have found positive associations between measures of social competence and mental state understanding. For instance, Capage and Watson (2001) investigated the links between false belief understanding and teachers' ratings of social competence and

aggression in a sample of 51 pre-schoolers. They found a significant correlation between children's performance on the false belief tasks and social competence as rated by teachers, after controlling for the effects of age and language. Charman et al. (2001) used parental ratings of social competence and found a significant relationship with ToM for typically developing children but not for children with Attention Deficit Hyperactivity Disorder (ADHD). Similar findings have also been reported for older children. A positive association between higher-order ToM functioning and teachers' ratings of social competence was reported for 10-11 year olds (Liddle and Nettle 2006). Bosacki and Astington (1999) investigated links between ToM and social competence (measured in terms of peer and teacher reported social skills and peer popularity) in a sample of 128 preadolescents. The findings of the study indicated a positive relationship of ToM with peer reported social skills but not with the measures of peer popularity. In addition there was no significant relationship between ToM and teachers' reports of social competence after controlling for the effect of verbal ability. Similar associations of mental state understanding have also been reported for peer popularity. For instance, Cassidy, et al. (2003) reported a significant association between ToM and peer popularity in pre-schoolers after controlling for the effect of verbal ability. Peterson and Siegal (2002) compared 57 popular and 52 rejected children between the ages of 3 and 5 years on false belief tasks and found that popular children performed better than the rejected children. Other studies have reported positive association between mental state understanding and peer popularity for girls and children older than 5 years (Slaughter et al. 2002; Braza et al. 2009). In addition, the results of a recent meta-analysis of 20 studies indicated a positive link between mental state understanding and peer acceptance (Slaughter et al. 2015). Similar findings have also been reported by another meta-analysis of 76 studies including 6,432 children between 2-12 years of ages (Imuta et al. 2016). The findings of this meta-analysis revealed a significant association between ToM and pro-social behaviour; this association was similar across gender, however, it was stronger for children 6 years and older.

Although the evidence for association between ToM and social competence

appears to be convincing, the direction of this association is yet not clear. It is also not clear whether the nature of this relationship is causal or not. Some evidence for establishing causality could be derived from longitudinal studies; however, the findings of these studies are inconsistent. For instance, Raza and Blair (2008) conducted a longitudinal study and found that the false belief understanding in preschool predicted social competence in kindergarten, and social competence in preschool predicted false belief understanding in kindergarten. Based on these findings, they concluded that the relationship between social competence and mental state understanding is bidirectional. In another longitudinal study Eggum et al. (2011) found that ToM at 42 months of age related to pro-social orientation 18 months later. However, further research is needed to clarify the direction of this association. Investigating the link between ToM and social competence in different cultural settings and using different approaches to measure social competence may be useful to further understand this association.

2.5 Current Thesis

The research included in the current thesis had three major aims. The first one was to investigate the development of ToM in a relatively less investigated and a culturally different setting. Since there is some evidence of variations in ToM acquisition within and between the collectivist and individualist cultures (Naito and Koyama 2006; Liu et al. 2008; Hughes et al. 2014; Wang et al. 2016), the current research investigated how Pakistani children (from an Eastern Collectivist culture) differ on ToM performance compared to Western samples. Most studies that compared ToM in Collectivist vs. Individualist cultures used a Chinese/Japanese sample to represent collectivist cultures (Naito and Koyama 2006; Liu et al. 2008; Wang et al. 2016). Although, Pakistan is a collectivist society, it differs in various aspects from other collectivist societies like China. For instance, Pakistan is a Muslim state and the religious teachings influence every facet of life. This influence is evident not only in familial aspect of life such as family sizes or parent-child interactions (which may affect ToM development), but also in broader social arena, which includes schooling systems. In addition, Pakistan is a developing country

and per capita income is very low compared to other countries. According to the statistics of the World Bank (2017), per capita income in Pakistan was $1,440 in the year 2015 compared to $38,840 for japan, and $7,900 for china. This economic disparity can have a negative impact on children's cognitive skills (Hughes et al. 2009). It has been suggested that Socioeconomic status (SES) can have indirect influence on ToM acquisition via its association with marital stability, parent-child interactions, parenting style, child vocabulary, and language processing efficiency (Bradley and Corwin 2002; Conger and Donnellan 2007; Conger et al. 2010; Fernald et al. 2013). Pakistani culture is also influenced by the rich traditions of ancient Indian and Indus valley civilizations. These influences add very distinct and unique features to the cultural atmosphere of Pakistan. The above mentioned factors contribute to making Pakistani culturedistinct from other collectivist cultures such as China.

Furthermore, differences in ToM development have also been reported within Individualist (UK and Italy) and collectivist (Hong Kong and Mainland China) cultures (Liu et al. 2008; Lecce and Hughes 2010; Hughes et al. 2014). This indicates that there may be other more subtle factors within each group or society that might be contributing to mental state understanding. It is therefore important to investigate ToM ability in different subgroups within the broader umbrella of collectivist and individualist cultures. There is little research on mental state understanding in the collectivist culture of Pakistan and the current research would be an important addition in ToM literature. Also, the current study allowed investigation of a unique situation where a collectivist culture is transplanted into a Western society. British Pakistanis are living in an individualist Western culture while experiencing the traditional collectivist values of their immigrant Pakistani parents. The influence of both collectivist and individualist culture might have an effect on the development of mental state understanding. Investigating ToM development in these unique situations could provide valuable insights in study of cognitive development.

The second aim of the thesis was to test the universality of links between ToM, EF and social competence (measured in terms of sociometric status and

pro/anti-social behaviours). The empirical evidence for association between ToM and EF is robust (Perner and Lang 2000; Moses 2001), however it is still unclear whether EF facilitates the expression of ToM or is required for the emergence of mental state understanding (Russell 1996; Carlson and Moses 2001). Investigating the link between ToM and EF in the cultural groups that are expected to vary in their performance on ToM tasks might help to advance our understanding of the expression vs. emergence debate of this link. False-belief understanding has also been linked with increased pro-social behaviours and decreased problem behaviours (Astington 2003; Hughes and Leekam 2004). However, the direction of association between ToM and SC is yet not clear and is often presented as bidirectional (Razza and Blair 2009). EF has also been linked to SC in a number of studies. In a recent study (Huyder and Nilsen 2012) it was noted that a component of EF (inhibitory control) was related to less competent behaviour. This indicated that inhibitory control allowed children to suppress socially inappropriate behaviours which may damage the relationships and hinder the accomplishment of a shared goal. However, most of the studies that have established links between ToM, EF and social competence were carried out in Western countries. The current research therefore, investigated these links in a relatively less studied cultural group. A final aim of the research included in this thesis was to investigate the link that has been established between two parental factors (parenting styles and maternal mental state talk) and ToM in Western cultures.

Chapter 3

Theory of Mind and Peer Acceptance among young Pakistani Children

3.1 Introduction

Human beings live in a very complex social milieu where they are constantly interacting with others around them. Developing and maintaining relationships with other social agents is basic to human existence, and requires multiple proficiencies. An important skill for social interactions is the ability to understand and to be able to predict, the behaviours of other people (Bosacki and Astington 1999). To develop such an understanding, it is crucial to appreciate that our behaviours are guided by internal mental states such as desires, intentions, and beliefs, rather than the state of events in the external world. We see examples of this relation between mental states and our behaviours in everyday life. For instance, a person goes to the kitchen and looks for a food item in the fridge but is surprised not to find it there. This person went to the kitchen because she wanted something to eat (desire) and looked in the fridge because she thought the food was in the fridge (belief). Her behaviours were guided by her mental states, and not by the real-life situation (i.e., the food had already been consumed by someone else).

The cognitive ability that enables an individual to attribute different mental states to self and others is known as Theory of Mind (ToM) (Slaughter et al. 2002). It is widely believed that most typically developing children pass ToM tasks around four years of age in the Western world (Wellman et al. 2001). However, recent cross-cultural research on ToM development shows some variance in the onset of mental state understanding (as depicted by performance on ToM tasks) in young children from different cultures. For example, a meta-analysis of ToM indicated that

Chinese children passed false belief tasks up to two years later than children from North America (Liu et al. 2008). Although there are many differences between Chinese and Pakistani culture, they share one commonality: they are both predominantly collectivist cultures. There is empirical evidence to suggest that children from collectivist cultures perform differently on ToM tasks than children from individualist cultures (Shahaeian et al. 2011; Wellman et al. 2011). It is therefore; reasonable to assume that the delay in ToM development observed in Chinese children (a collectivist culture) may also be prevalent in Pakistani culture.

Young children's understanding of mental states is sometimes associated with their social skills. Being able to understand another person's desires and emotions enables one to behave appropriately in different social scenarios. Interacting with peers provides a unique opportunity to practice and develop these social skills. One aspect of peer relationships that has received considerable research attention with regards to ToM, is peer acceptance (Bosacki and Astington 1999; Slaughter et al. 2002), which refers to the degree to which a child or adolescent is liked by his/her peers (Hymel et al. 2002). Research suggests that children who are liked more by their peers (popular children), perform better on ToM than children who are liked less (rejected children) (Slaughter et al. 2002). However, research findings in this regard are not very consistent, which calls for further investigation of the links between ToM and peer acceptance. We aimed to test cultural variations in ToM development and its association with peer acceptance in a sample of Pakistani children. The following chapter provides the details of two studies that were conducted to test ToM development in young Pakistani children, and its association with peer acceptance.

3.2 Study 1

A wealth of research has been accumulated on children's ability to understand mental states in the last three decades, with a major focus on how and when children develop this understanding. Fodor (1992) argued that belief-desire psychology is innate and there is no reason why young children's ToM should be considered different from adult folk psychology. In other words, children are born with an innate ability to perceive mental states and their ability to do so is no

different from adults. However, research in the last decade has revealed that children make remarkable progress in their performance on ToM tasks around 4 years of age (Wellman et al. 2001). A meta-analysis of 178 studies revealed that children younger than 4 years of age make consistent systematic errors on false belief tasks that cannot be attributed to chance only. For instance, in the classic Sally-Anne test (Baren-Cohen et al. 1985), children are asked to report where Sally would look for the marble (that she had earlier placed in a green box but was moved to red box by Anne in Sally's absence). Children younger than 4 years consistently report the current location of the marble (i.e. Sally will look in the red box), which indicates a failure to represent Sally's false belief that the marble was in green box. However, around 4 years of age children's correct responses on false belief task are above chance (Wellman et al. 2001). This finding denies the notion of non-existent developmental change in children's understanding of mental states. In addition, the findings of a meta-analysis revealed that children's performance on the false belief task was also influenced by their country of origin (Wellman et al. 2001). Children from Australia and Canada performed better than children from USA and UK, who performed better than children from Austria and Japan. Further research in this field identified several social factors that account for individual variations in the understanding of mental states. Most of these factors comprised of family structure, or the quality of parent child relationships. For example, Perner et al. (1994) found that children from larger families (with at least two siblings) performed better on ToM tasks than children from smaller families (no siblings). In addition to family structure, mother's use of mental state words was found to predict variations in children's ToM understanding at a later age (Ruffman et al. 2002; Ensor et al. 2013). Outside the family, children's ToM understanding has been associated with mental state content in peer conversations (Hughes and Dunn 1998) as well as acceptance by the peer group (Banergi et al. 2011).

The social factors mentioned above can vary between cultures and therefore one could expect differences in the development of mental state understanding. This is in accordance with the social constructivist perspective, which postulates that development is a by-product of social and cultural influences

(Vinden 1999). However, research on cultural variations in ToM understanding has yielded mixed results with some studies indicating a universality in the age of ToM acquisition, whereas others report significant age differences in understanding of mind across cultures. Callaghan and colleagues (2005) compared false-belief understanding across 5 cultures; Canada, India, Peru, Samoa, and Thailand. Their findings indicated that children from all cultures passed false-belief tasks around 5 years of age, and there were no significant differences in the onset of mental state understanding. In another study, Sabbagh et al. (2006) found no differences in performance on ToM tasks between Chinese and American children, and this finding was consistent with previous studies that compared Chinese and American children on false belief understanding (Lee et al. 1999; Liu et al. 2004). In contrast, a meta-analysis of ToM studies from North America and China indicated a delay of up to two years in the timings of ToM development in Chinese children (Liu et al., 2008). Naito and Koyama (2006) tested Japanese children on two false-belief tasks and found that children's mastery of false-belief was substantially later and slower than typically reported. Furthermore, similar delays have also been reported for Italian children, when their performance on false-belief tasks was compared to British children (Lecce and Hughes 2010).

In an attempt to explain this cultural variation in ToM development some researchers have focused on the general differences between collectivist and individualist cultures (Shahaeian et al. 2011; Wellman et al. 2011). The major difference that has been recognized between these two cultural orientations is their emphasis on interdependence vs. independence (Greenfield and Suzuki, 1998). Collectivist cultures (such as China and Japan) value interdependence and promote the qualities of obedience, conformity, cooperation, and adherence to rules (Greenfield and Suzuki 1998). Individualist cultures (such as America and UK) on the other hand, promote emotional independence, assertiveness, and autonomy (Greenfield and Suzuki 1998). The proponents of 'collectivist vs. individualistic cultures' argue that the understanding of mind is influenced by cultural norms and attitudes (Ames et al. 2001). Children from collectivist cultures have been reported to exhibit lower performance on ToM tasks when compared to

their counterparts from individualist cultures (Naito and Koyama 2006; Liu et al. 2008).

Pakistan is also a collectivist society where interdependence is heavily valued and children are expected to show obedience and adherence to authority. To date there is only one published piece of research on ToM development in Pakistani children that tested 3-5 year olds on desire, pretence, and belief (Nawaz et al. 2014). The findings indicate a delay in ToM development in Pakistani children when compared with Western expectations. According to the results of this study, Pakistani children move from below chance to at chance performance in their fifth year, compared to better chance performance at 4 years reported for Western cultures. The aim here was to test ToM understanding in five to eight years old Pakistani children to investigate exactly when they made the below chance to above chance transition.

3.2.1 ToM and Peer Acceptance

At the same time that children are developing the ability to understand mental states (around 3-5 years of age), they also get a chance to make new friendships outside the home. Preschools and nurseries provide opportunities to interact with other children of similar ages and form friendships. Interactions with peers help children develop a wide range of social and communication skills (Sebanc 2003; Ladd 2005; Bulotsky-Shearer et al. 2011). Social skills refer to behaviours that promote positive interaction with others and the environment (Lynch and Sympson 2010). These skills may include, but are not limited to, showing empathy, generosity, helpfulness, effective communication, negotiating, and problem solving (Lynch and Sympson 2010). It has been reported that children get an opportunity to learn and improve these skills during play with peers (Barbakoff and Yo 2002). The effectiveness of these interaction skills determines the level of a child's social competence. Young children's understanding of mental states has also been associated with both their social competence and peer relationships (Bosacki and Astington 1999; Slaughter et al. 2002). One aspect of peer relationships that has received considerable research attention with reference to ToM, is peer acceptance: the degree to which a child or adolescent is liked by

his/her peers (Hymel et al. 2002). The concept of peer acceptance is not only limited to likeability, but also encompasses many other aspects of relationships in peer groups such as visibility or salience in the group, how the child connects to different members of the group, position in group hierarchy, and how the members of the group perceive the child (Hymel et al. 2000). This emphasis on the child's position in the group is based on Moreno's (1934) proposition that behaviour can only be understood in terms of a social framework and the group in which the individuals' function (Hymel et al. 2002).

Sociometry provides methods for measuring and quantifying information about individuals within a group (Hymel et al. 2002). The position of an individual in a group is depicted by sociometric status, determined by measuring interpersonal attraction among members of a specific group. The most widely used sociometric evaluation methods are nominations and ratings. With the nomination method participants are asked about their group members in terms of specified positive or negative criteria. The questions asked may be direct preference questions (e.g., name the class mate you like the most/least), or indirect (e.g., name the class mate you like/don't like to play with). In the ratings method, the participant is asked to rate everyone in the list as most liked, least liked, or disliked. So that memory abilities are not taxed, children are usually provided with a list of the group members' names or, (in the case of younger children) photographs of the group members. The number or proportion of positive nominations received provides an index of attraction or acceptance, whereas the number or proportion of negative nominations received provides an index of rejection within the group. Popular children who receive more positive evaluations have been found to exhibit higher levels of pro-social behaviours, social problem solving, and communication skills (Coie et al. 1990; Dodge and Feldman 1990). On the other hand, rejection has been associated with an increased risk for externalised problems such as poor school adjustment (Buhs and Ladd 2001; Schaeffer et al. 2003), disruptiveness, and physical aggression (Newcomb et al. 1993), as well as internalised problems such as feelings of loneliness, social anxiety, depression, and negative self-appraisals (Parker and Asher 1987; Kupersmidt and Coie 1990; Rubin et al. 1998).

With reference to the links between ToM and peer acceptance as measured by peer popularity, it has been suggested that children with advanced ToM could have an advantage in their interactions with peers because they can better understand the others' perspectives (Astington and Jenkins 1995; Lalonde and Chandler 1995; Hughes and Leekam 2004). Although it seems plausible that children's understanding of mental states allows them to interact effectively with their peers, research findings on associations between ToM and peer acceptance have been somewhat inconsistent. Badenes et al. (2000) compared 4-6-year-old peer-rejected children with popular and average children on ToM tasks and found that rejected children performed similar to other children on false belief and deception tasks. Watson et al. (1999) used teacher's ratings of popularity rather than peer ratings, and found no concurrent correlation between ToM and teacher's ratings of popularity. On the other hand, Peterson and Siegal (2002) reported that popular children performed better on false belief measures than the rejected children. Cassidy et al. (2003) found a significant association between ToM and peer popularity in pre-schoolers, after controlling for the effect of language ability. Likewise, Dockett (1997) found that ToM was positively correlated with peer popularity, indicating that popular children had greater understanding of mental states. Other studies have reported that the association between ToM and peer popularity is moderated by other factors. For example, Braza et al. (2009) reported that the relationship between perspective taking and peer acceptance is moderated by gender. They found a positive relation between perspective taking and peer acceptance in girls only. Slaughter et al. (2002) found that ToM was significantly related to peer acceptance only for children over 5 years of age. They suggested that the impact of ToM ability on peer acceptance is modest, but increases with age. Furthermore, a recent meta-analysis of 20 studies including 2,096 children revealed a positive link between ToM understanding and peer acceptance (Slaughter et al. 2015). Thus, it can be concluded that there is a relationship between ToM and peer acceptance, albeit a moderate one that is influenced by gender and age.

The existing literature on the relationship between ToM and peer acceptance has predominantly focused on sociometric status that depicts the position of an individual in a group (Badenes et al. 2000; Slaughter et al. 2002). Nevertheless, another way of conceptualizing peer acceptance is to focus on the internal experiences of the individuals rather than the group perspective. 'Interpersonal acceptance/rejection theory' (IPARTheory) (Rohner et al. 2007) deals with the perceived quality of relationships between individuals. IPARTheory postulates that perceived acceptance and rejection are two ends of the warmth dimension of interpersonal relationships. The warmth dimension of interpersonal relationships refers to the physical, verbal, and symbolic behaviours that one uses to express one's caring, or lack of caring, attitude towards another (Rohner 2016). This dimension of warmth in relationships is presented as a continuum with acceptance on one end, and rejection on the other end. Acceptance in interpersonal relationships refers to the affection, warmth, care, comfort, nurturance, and support that one experiences in a relationship. On the other hand, rejection refers to the absence of these positive behaviours and the presence of physically and psychologically hurtful behaviours (Rohner 2016). Rohner (2016) suggests that individuals are neither fully accepted nor rejected, but experience varying degrees of interpersonal acceptance and rejection. In addition, interpersonal acceptance/rejection can be studied either as perceived by the individual (subjectively) or reported by others (objectively). The subjective and objective reports of acceptance/rejection can either supplement each other, or indicate discrepancies between the reports of observer and the individual. In case of discrepancies, Rohner (2016) suggests prioritising the subjective reports, because it is possible that a person may feel unloved or rejected but may not exhibit any indicators of rejection for an outside observer. When individuals do not receive acceptance from significant others, they experience rejection and tend to develop specific emotional and behavioural responses such as anxiety, insecurity, dependence, and aggression (Rohner et al. 2007). Rejection from significant others has also been associated with emotional unresponsiveness, emotional

instability, impaired self-esteem, impaired self-adequacy, as well as negative world view (Rohner et al.2007).

As mentioned earlier, the literature on the relationship between ToM and peer acceptance has predominantly focused on sociometric status or objective acceptance (Badenes et al. 2000; Slaughter et al. 2002) whereas perceived or subjective acceptance has largely been ignored. Self-perceived acceptance/rejection can be linked to ToM in that children must be able to read their peers' minds accurately, to be able to get the clues about their own likeability or dis-likeability. Consequently, a child who passes ToM tasks should have a better and more accurate idea of who likes/dislikes him. It is also possible that there may be some discrepancy in the child's perception of peer acceptance and the actual acceptance (sociometric) that he/she receives. Research indicates that young children's self-perceptions are often overinflated (Harter, 1983) resulting in high self-ratings of competence (Butler 1990; Madigan et al. 2002). It is possible that a child's perception of peer acceptance may be higher than the actual acceptance reported by the peers. Such discrepancies between the child's perception of peer acceptance and the actual peer acceptance may also indicate shortcoming in ToM understanding.

Since there is some evidence to support the cultural variations in ToM development, we aimed to test the mental state understanding in a Pakistani sample. Based on existing literature it was expected that Pakistani children (like other Asian children from collectivist societies) would show some delay in ToM understanding. Furthermore, based on the above-mentioned evidence for the link between ToM and peer acceptance, the aim here was to test whether this relationship was influenced by culture. It was hypothesized that the children with better ToM understanding would receive high sociometric ratings. In addition, a measure of perceived peer acceptance was also included, which provided a phenomenological perspective of acceptance in interpersonal relationships. It was hypothesized that there would be a positive link between ToM and perceived acceptance, and that sociometric status will positively correlate with perceived peer acceptance.

3.2.2 Aims and Objectives

The aim of the current research was to assess ToM development in young Pakistani children. As discussed above, recent research has reported cultural variations in the age at which children exhibit ToM understanding. To date there is only one published research that has tested ToM development in 3-5 years old Pakistani children, indicating that children move from 'below chance' to 'at chance' performance in their 5th year (Nawaz et al. 2014). The aim was to assess the 'below chance' to 'above chance' transition in Pakistani children between 5 to 8 years of ages using a variety of ToM tasks. The hypothesis was that 5-year-old children would perform 'at chance', and 6-year-old (and older) children would perform 'above chance' on ToM tasks. Another aim was to investigate how peer acceptance in terms of sociometric status and self-perceived acceptance related to ToM understanding. It was hypothesised that children with better ToM understanding would receive high sociometric ratings and that their sociometric status would positively correlate with their self-perception of peer acceptance.

3.2.3 Method

3.2.3.1 Participants

The participants were selected from four public schools in Islamabad, Pakistan. A total of 65 young children (33 girls and 32 boys) within the age range of 5 years 2 months to 8 years 6 months (M=6 years and 9 months) were tested. G-Power software suggested that at least 27 participants in each condition would give a power of 0.95 and an effect size of r=0.3.

3.2.3.2 Exclusion Criteria

Teachers were asked to identify any children who had difficulties with Urdu language comprehension and those children were not recruited for the study. This was done because Islamabad is a capital city where people from different provincial backgrounds reside and different languages are common. It is noteworthy here to mention that due to lack of awareness and diagnostic facilities (such as paediatric psychiatrists, school psychologists /psychiatrists and consultation clinics) children with developmental disorders can often be at mainstream schools in Pakistan. Therefore, teachers were asked to identify

children with problematic behaviour. Children who were identified as difficult or problematic by their teacher were also excluded so that only typically developing children were tested.

3.2.3.3 Design

A 4 (age groups 5 years vs. 6 years vs. 7 years vs. 8 years) by 4 (ToM tasks: emotion vs. desire vs. deception vs. unexpected content) by 2 (peer relationship tasks: sociometric status vs. perceived acceptance) mixed design was used, with repeated measures on the last two factors. Each child received four ToM tasks and two nomination tasks for assessment of peer acceptance. The presentation of tasks was counterbalanced to prevent order effects. ToM tasks included the desire, unexpected content, emotion, and deception task.

Desire Task: This task was used to assess the understanding that different people can have different desires and that their behaviours will be guided by their desires (Slaughter et al. 2002). The task consists of a story where a character is introduced and the participant is told that the character is hungry. The participant is then shown two food options; a vegetable and a cookie, and is asked which one is his/her (the participant's) favourite? If the participant selects a cookie he/she is told that the character in the story likes vegetables (or if the participant's favourite was vegetables, they are told that the character likes cookies). Then the participant is requested to help the experimenter choose a snack for the story character. The participant must select the food that the story character likes in order to exhibit an understanding of others' desires. If the participant selects the food that they themselves like than this shows that the participant is unable to inhibit her/his own desire and take into account the other person's desire.

Unexpected Content Task: This task was used to measure false belief understanding (Gopnik and Astington 1988). A Bunties sweets box that is widely recognized by Pakistani children was selected for this task. The participant is shown the box and then shown that the box has pens inside. Then the participant is asked what would a story character think is inside the box before he/she opens it? If the participant answers sweets or Bunties then he/she has demonstrated an

understanding that the character would have a false belief about the contents of the box. However, if the participant says pens than that means the participant is reporting his/her own knowledge and not the belief of the character.

Emotion Task: The emotion task (Slaughter et al. 2002) consists of a story in which a child character wants socks for his/her birthday gift. However, the character receives a different gift, either a car or a doll. The car (used for male participants) and doll (used for female participants) were selected as desirable gift options for participants, to test whether they can differentiate between how they will feel and how the character will feel. The participant is then asked whether the story character will feel happy or sad to receive the gift. The rationale behind this task is that the participant might feel happy to receive a car/doll rather than a pair of socks, however, the participant needs to report the emotion of the character and not his/her own feelings. If the participant responds that the character would be happy to receive the car/doll gift, this indicates an incorrect understanding of the character's mental state, but if the participant responds that the character would be sad then this demonstrates a comprehension of the character's emotional reaction.

Deception Task: This task measures whether a participant can manipulate the behaviour of another person by giving them wrong information (Peskins 1992). The task consists of a toy character and two different types of candy. The participant is first asked, 'which of these two is your favourite?' They are then told that the toy character always takes the same candy that the participant wants. The participant must deceive the toy character by pointing to a different candy in order to get the candy that they themselves would like.

Sociometric Status: For sociometric status, the rating method was used. Each participant was read out the names of all his/her class fellows from the list and was asked to say whether they liked or disliked them. A similar procedure was used for self-perceived acceptance, where the participant was asked to indicate whether the children in the list (names of class fellows were called out) liked or disliked him/her.

3.2.3.4 Materials

A picture of a boy character and two pictures of snacks (carrot and cookie) were used for desire task. A clearly marked sweet box (bunties) with pens inside it and a toy mouse was used for false-belief content task. For emotion task, pictures of a boy/girl, and of a toy car/doll were used. A teddy bear and two different types of candy were used for deception task. Score sheets were used to record the responses on ToM tasks. A separate sheet that had the names of all the students in participant's class was used for self-perceived acceptance and sociometric status (see Appendix A for materials used in Study 1).

3.2.3.5 Procedure

An ethical approval for the research was gained from Chair of the Humanities, Social and Health Sciences Research Ethics Panel at the University of Bradford (E.162). Permission was also given by the Federal Directorate of Pakistan to conduct a research experiment in the federal schools. Initially eight public schools in Islamabad were contacted and briefed about the research, out of these, four schools with the largest number of students were selected to be included in the data collection. Class teachers were given consent forms and information sheets to be sent to parents. Each child was tested individually in a quiet area of the school's activity room. It took about 10-15 minutes on average to complete all the tasks for each child. The following tasks were used to measure ToM and peer-acceptance:

Desire Task: the participant was shown a picture of a boy character named Ahmad and was told that it is snack time and Ahmad is really hungry. The participant was then shown pictures of a carrot and a cookie and was asked, 'which one of these do you like the best, carrot or cookie?' If the participant said carrot, the experimenter told her/him that Ahmad actually likes cookies a lot (if the participant liked cookies he/she was told that Ahmad likes carrots). Then the experimenter told the participant that it is snack time and we can give one of these snacks (carrot or cookie) to the character. At this point, the participant was asked

the test question, ‘so what shall we give to Ahmad for a snack, a cookie or a carrot’? The cookie/carrot options were presented in a random order. To pass the task the participant had to choose the food option that Ahmad liked, and not the one that they themselves liked.

Unexpected Content Task: the participant was shown a Bunties sweets box and was asked what they thought was inside the box. After the participant’s response, the experimenter opened the box and revealed the contents of the box, saying, ‘shall we open the box and look what is inside, oh there are some pens in this box’. The experimenter then put the pens back inside the box and closed it. At this point a toy mouse is introduced, ‘look who is here, this is Jerry and Jerry has never ever looked inside this box’. The participant is then asked the test question, ‘what does Jerry think is inside this box? To pass the task the participant had to answer ‘Bunties’ or ‘sweets’ to the test question.

Emotion Task: the participant was shown a picture of a story character, a girl named Aliya for female participants and a boy named Ali for male participants. They were then told that it is the character’s birthday and he/she wanted a pair of black socks as his/her birthday gift. However, when the character opens his/her gift it is either a toy car (in case of male participants) or a doll (for female participants). The participant was then asked the test question ‘how do you think the character will feel to see this gift, happy or sad?’ The happy and sad options were presented in random order. To pass this task the participant had to answer ‘sad’ to test question.

Deception Task: The participant was shown two pieces of candy and asked which one was his/her favourite. They were then introduced to a teddy bear and were told that the teddy always takes the same candy that a child likes. The experimenter then asks the test question, ‘now will you tell the teddy which is your favourite candy?’ in order to pass the test question the participant had to say the other candy, not the one that he/she had initially indicated as his/her favourite.

Socio metric status: ratings method was used for measuring the sociometric status of participants. A list of names of all children in each class was generated.

Each participant was then asked to indicate whether he/she liked or disliked the children on the list. The experimenter said to the participant, ‘now I am going to call the names of the children in your class and I want you to tell me whether you like or dislike them’. The ‘like’ and ‘dislike’ options were presented in a fixed order where like was always mentioned first. Positive ratings for each child were aggregated and converted to percentages to provide a score for sociometric status (0-100).

Self-perceived peer acceptance: in this task the participant was told that the experimenter would call out the names of his/her class fellows and wanted the participant to indicate whether they thought that the class fellow liked or disliked him/her (the participant). With each name, the participants were asked, ‘can you tell me whether (name of class fellow) likes you or dislikes you?’ The ‘like’ and ‘dislike’ options were present in a fixed order where like was always mentioned first. The total number of ‘likes’ was aggregated and converted to percentages to provide a score for self-perceived peer acceptance (0-100).

3.2.4 Results

The current study aimed to investigate ToM development and its association with peer acceptance in Pakistani children (aged 5-8 years). For this purpose, 65 children were given four ToM tasks and two peer acceptance/rejection tasks. ToM tasks were scored as 1 for a correct answer and 0 for an incorrect answer. Percentages of positive ratings by peers were calculated to indicate sociometric status. For self-perceived peer acceptance, the percentage of likes reported by the participant was calculated. Mean scores of ToM tasks were calculated to give the average performance. One-sample t-tests were conducted to find out the difference between expected and observed mean values on overall ToM score for each year of age. A series One-sample t-tests was also conducted to test the difference between the mean value expected by chance and the observed mean value of participants on individual tasks of ToM at each year of age. Pearson correlations were carried out to find out the relationship between ToM, sociometric status and perceived peer acceptance rejection.

3.2.4.1 Demographics and Descriptive Analysis

Table 1. Age and gender of Participants

	Age (in months)			Gender	
	Mean	S.D	Range	F	M
Total Sample (N=65)	84.15	13.36	63-103	33 (51%)	32 (49%)

Table 1 presents demographics of age and gender for the entire sample. The age range of participants was 63 to 103 months (*M*=84.15, *SD*=13.36). There were roughly equal numbers of male and female participants.

Table 2. Mean and Standard Deviation of individual ToM tasks and total ToM score (N=65)

Tasks	Mean	(St. Dev)
ToM Desire (0/1)	.64	(.48)
ToM Unexpected content (0/1)	.56	(.49)
ToM Emotion(0/1)	.41	(.49)
ToM Deception (0/1)	.07	(.26)
ToM Total (0-4)	1.7	(1.19)

Table 2 presents the mean scores on different ToM tasks and total ToM score (which is the sum of scores on four tasks) for participants. The mean for desire

task is highest indicating that most children performed well on desire task. Whereas the mean for deception task is lowest, indicating that children did not perform as well on this task. The mean on total ToM score (1.7) indicated that, on average, children got under half of the ToM tasks correct.

3.2.4.2 Main Analysis

This section includes the results of single t-tests that have been used to analyse the difference between the actual mean scores of the participants and mean scores expected by chance on ToM tasks for different age groups. In addition it also includes findings from Pearson correlation between the variables (ToM, self-perceived peer acceptance and sociometric status).

Table 3. Results of One-Sample t-test and Descriptive Statistics of Total ToM Scores for Different Age Groups

	Mean	*SD*	*t*	*df*	*p*
5 year olds (N=15)	1.00	1.06	-3.62	14	.003
6 year olds (N=16)	1.62	1.02	-1.46	15	.164
7 year olds (N=16)	2.06	1.28	.194	15	.849
8 year olds (N=18)	2.05	1.16	.203	17	.842

The range of total score for ToM tasks was 0-4, therefore 2 was specified as test value. The results of One- Sample t-test presented in table 3 indicated that the mean score of 5-year-olds (*M*= 1.00, *SD*= 1.06) was significantly different than the expected mean; *t(14)*=-3.62, *p*=0.003). This suggested that the performance of this group was significantly lower than would be expected by chance. On the other hand, there was no significant difference in the observed and expected mean scores of and 6-year-olds (*M*= 1.62, *SD*= 1.02); *t(15)*= -1.46, *p*=0.164, 7-year-olds (*M*= 2.06, *SD*= 1.28); *t(15)*=.194, *p*=0.849 and 8-year-old participants (*M*= 2.05,

SD= 1.16); *t(17)*= .203, *p*=0.842. This suggested that the performance of 6, 7 and 8-year-olds could be attributed to chance.

One-Sample t-tests were also carried out for individual ToM tasks to analyse the difference between observed mean scores of the participants and the scores that would be expected by chance. Since the tasks were scored as 0 or 1, .5 was specified as the mean score expected by chance.

Table 4. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 5-year-olds (N=15)

	Mean	*SD*	*t*	*df*	*p*
Desire	.33	.48	-1.32	14	.207
Content	.40	.50	-.764	14	.458
Emotion	.20	.41	-2.80	14	.014
Deception	.06	.25	-6.50	14	.000

The results of One-Sample t-tests in Table 4 indicated no significant difference in the observed and expected mean scores (*M*=.33, *SD*=.48) of desire task; *t(14)*=-1.32, *p*=0.207. Similarly, there was no significant difference in the expected and observed mean scores (*M*=.40, *SD*=.50) of content task; *t(14)*=-7.64, *p*=0.458, for the 5-year-olds. This suggested that the performance of 5-year-olds on desire and content tasks was no different than would be expected by chance. On the contrary there was a significant difference in the observed and expected mean values of emotion (*M*=.20, *SD*=.41); *t(14)*=-2.80, *p*=0.014, and deception tasks (*M*=.06, *SD*=.25); *t(14)*=-6.50, *p*=0.000.This suggested that the performance of 5-year-olds on emotion and deception tasks was worse than would be expected by chance.

Table 5. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 6-year-olds (N=16)

	Mean	*SD*	*t*	*df*	*p*
Desire	.75	.44	2.23	15	.041
Content	.56	.51	.488	15	.633
Emotion	.31	.47	-1.56	15	.138
Deception	.00	.00	-	-	-

The results of One-Sample t-tests in Table 5 indicated a significant difference in the observed and expected mean scores (*M*=.75, *SD*=.44) of desire task, *t(15)*=2.23, *p*=0.041, for the 6-year-olds. This suggested that the performance of 6-year-olds on desire task was better than would be expected by chance. However, there was no significant difference in the observed and expected mean values (*M*=.56, *SD*=.51) of content task; *t(15)*=.488, *p*=0.633. Similarly, no difference was found in the expected and observed mean score (*M*=.31, *SD*=.47) of emotion task; *t(15)*=1.56, *p*=0.138). These results indicated that the performance of 6-year-olds on these tasks could be attributed to chance. All the children failed the deception task; therefore, the test could not be carried out for this task.

Table 6. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 7-year-olds (N=16)

	Mean	*SD*	*t*	*df*	*p*
Desire	.81	.40	3.10	15	.007
Content	.56	.51	.488	15	.633
Emotion	.50	.51	.000	15	1.000
Deception	.18	.40	-3.10	15	.007

According to the results presented in table 6, the observed mean score (*M*=.81, *SD*=.40) of 7-year-olds on desire task was significantly different than the expected mean value; *t(15)*=3.10, *p*=0.007. This indicated that the performance of 7-year-olds was better than would be expected by chance on desire task. However, there was no significant difference in the observed and expected mean score (*M*=.56, *SD*=.51) of content task; *t(15)*=-.488, *p*=0.633) as well as the emotion task (*M*=.50, *SD*=.51); *t(15)*=.000, *p*=1.000. The observed and expected mean scores (*M*=.18, *SD*=.40) were significantly different for the deception task; *t*=-3.10, *p*=0.007, indicating that the 7-year-olds performed worse than would be expected by chance on this task.

Table 7. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 8-year-olds (N=18)

	Mean	*SD*	*t*	*df*	*p*
Desire	.77	.42	2.75	17	.014
Content	.72	.46	2.04	17	.057
Emotion	.61	.50	.940	17	.361
Deception	.05	.23	-8.00	17	.000

As per the results presented in table 7, the observed mean score (*M*=.77, *SD*=.42) of 8-year-olds on desire task was significantly different than the expected mean value; *t(17)*=2.75, *p*=0.014. This indicated that the performance of this age group on the desire task was better than would be expected by chance. However, there was no significant difference in the observed and expected mean scores on content (*M*=.18, *SD*=.38); *t(17)*=2.04, *p*=0.057, and emotion tasks (*M*=.61, *SD*=.50); *t(17)*=.940, *p*=0.361. These findings indicated that the performance of 8-year-olds on content and emotion tasks was no better than chance. Furthermore, the observed and expected mean scores (*M*=.05, *SD*=.23) of 8-year-olds were significantly different for the deception task; *t(17)*=-8.00, *p*=0.000, indicating that the 8-year-olds performed worse than would be expected by chance on this task.

Table 8. Pearson Correlation between ToM, Self-perceived peer acceptance (SPPA) and sociometric status (SS)

	ToM	SPPA	SS
ToM	-	-.212	-.104
SPPA		-	.245*
SS-			-

*$p < .05$

The possible range of scores on ToM tasks was 0-4 where higher scores indicated better ToM ability. The possible range of scores on perceived peer acceptance was 0-100, where higher scores meant higher perceived acceptance. The possible range of scores on sociometric status was also 0-100, where higher scores meant popularity in the group or high liking by the group. There was no significant correlation between ToM score and both measures of peer acceptance. However, the correlation between self-perceived peer acceptance and sociometric status was significant (r=.245, p=.049).

3.2.5 Discussion

The current research was carried out to examine the development of ToM in young Pakistani children and to investigate its relationship with peer acceptance (self-perceived and sociometric status). Sixty-five children between the ages of 5-8 years were tested on four ToM tasks namely desire, unexpected content (FB), emotion, and deception. The findings revealed that on an overall score of ToM, children performed worse than chance at 5 years of age and at chance at 6, 7 and 8 years of age. These findings indicated that the Pakistani children's performance on ToM tasks was different than what the existing literature suggested. A meta-analysis of ToM development (Wellman et al. 2001) indicated that children who are 41 months old (3 years and 5 months) or younger, performed below chance, whereas at 48 months (4 years) or older children performed above chance on false belief tasks. However, later studies that investigated ToM development in different

cultures reported delays of up to 2 years in the timing of ToM acquisition (Liu et al. 2008). The only published study on Pakistani children to date reported that children make a transition from below chance to at chance on desire, pretence and belief in fifth year of age (Nawaz et al. 2014). The present study tested children not only on desire and false belief tasks but also on mental states of emotion and deception. The findings of current study corroborate those of Nawaz et al. (2014) in that the children performed at chance on desire task in the 5th year of age.

The lag found on overall ToM performance could possibly be attributed to the inclusion of deception and emotion tasks. This possibility was partially supported by the findings of One-Sample t-tests on individual tasks of ToM. On desire task 5 year olds performed at chance, which is in line with the findings of the previous study on Pakistani children, that reported below chance, to at chance, transition in the fifth year, on understanding of other's desires (Nawaz et al. 2014). This however, is in contradiction to Wellman (1990) who indicated that children develop an understanding of desire in the third year of life. In the present study, the children made at chance to above chance transition in their sixth year on the desire task. This corroborated Nawaz et al. (2014), who also reported a three years delay in the understanding of desire in Pakistani children.

On the unexpected content task, children showed a trend towards above chance performance in their 8th year. However, they were still performing at chance on the emotions task, and worse than chance on the deception task in their 8th year. On the deception task, the performance of all age groups was very poor and even 8-year-olds performed worse than chance. Although research evidence indicated that children start to conceal information at around 4-5 years of age (Peskin 1992), it seems probable that like other mental states such as desire, understanding of deception might also be delayed in Pakistani children. However, it is also possible that a methodological issue might have contributed to these findings. The poor performance on deception task could be linked to the way it was administered. Most of the children failed this task, and this could be because they were unable to understand what the protagonist was trying to do (take the same chocolate that the participant wanted). This failure could be due to two reasons.

First, in the current study only one protagonist was used, who always took the candy that the child wanted, and second, the participants were not given any practice trials. Peskin (1992) used two protagonists: a bad character who always took the candy that the child wanted; and a good one who never took the child's favorite candy. This contrast could have been useful to help children understand what the bad character was trying to do and how to deceive it. Peskin (1992) also pointed out that children had difficulty fully understanding the intention of the puppet through verbal explanation of the task. They only understood the intention of the puppet when they experienced the puppet taking away their desired object. It is therefore possible that if participants had been given practice trials before the actual trial, their performance could have been better.

Another objective of the study was to investigate relationship between ToM and peer acceptance, however, no significant relationship was found. A meta-analysis of twenty studies conducted to investigate links between ToM and peer acceptance (in terms of peer popularity) indicated a positive relationship between peer acceptance and ToM ability, however, the effect size was very small, with ToM explaining only 3.6% variance in peer acceptance (Slaughter et al. 2015). The authors of this meta-analysis argue that the small magnitude of this overall effect can account for inconsistent findings regarding links between ToM and peer acceptance in existing literature, and this issue can only be solved where the sample size is sufficient. There is a possibility that if the sample size for current study was larger, a significant association might have been found.

In sum, the findings of current study verified the previously reported delay in ToM development in Pakistani children. The study extended the range of mental states tested previously and included the emotion and deception tasks. Furthermore, the current study also extended the age range of participants to 8 years old. The findings of the study indicated that children moved from below chance to at chance performance on overall ToM in their 6th year. However, even 8-year-old participants in the sample performed at chance on the overall ToM score as well as on emotion task. Furthermore, the performance of 8-year-olds

was worse than chance on the deception task. No significant relationship was found between ToM and both measures of peer acceptance.

3.3 Study 2

Study 1 was carried out to assess understanding of four mental states in young Pakistani children and the findings of the study indicated a significant delay compared to the expected age in existing literature. One methodological issue identified in this study was the difficulty of ToM tasks presented to children. In particular, one task that most children failed in Study 1 was related to their understanding of deception. Peskin (1992) demonstrated that most of 4-5 year olds could successfully conceal information from a protagonist on the deception task. However, in Study 1, not only did the majority of children fail, but even 8 year olds performed worse than chance on this task. Hala and Carpendale (1997) suggest that the children's failure on deception task used in Peskin (1992) might be due to the demands of the task, rather than the emerging understanding of mental states. They argued that in this deception task, children are not only required to keep in mind the belief of the protagonist, but also keep track of the intentions of the protagonist, which adds to the complexity of the task. Considering that Pakistani children showed a lag even on the desire task (which according to existing literatures emerges during 3rd year of life), it seemed very taxing to include a complex deception task. Furthermore, it was presumed that absence of a significant relationship between peer acceptance and ToM in the 1st study could possibly be attributed to a smaller sample size as pointed out by Slaughter et al. (2015). Hence a second study was designed to replicate and extend the first study with a new and larger sample and some alterations to the tasks.

In the second study, it was decided to replace the deception task with a basic false belief (FB) location task (Baron-Cohen et al. 1985). This task was selected because it is the most common and widely used FB task to measure ToM in children (Doherty 2009). It has been reported in Western literature that most 3 year olds fail this test whereas most 4 year olds are able to answer correctly (Perner et al.1987). This test was deemed easier than the deception test and therefore it was decided to include it in Study 2. In addition, measures of executive

functioning (EF) and social competence were also included in this second study.

There is increasing evidence to link EF mastery to success on ToM tasks (Perner and Lang 2000; Moses 2001). Researchers have attributed the association between EF and ToM to the fact that both develop rapidly during preschool years, and share similar neural processes (Sabbagh and Taylor 200; Carlson and Moses 2001). Furthermore, Wellman et al. (2011) argue that the ToM tasks put similar demands on EF and cognitive flexibility: they deal with two alternatives and one alternative has to be inhibited to choose the other, or correct, alternative. Additionally, the associations reported between ToM and EF have been consistent across age and culture. Henning et al. (2011) tested 195 children between 3-6 years of ages on tasks of EF and ToM. There was a significant correlation between ToM and EF even after the effects of age, sentence comprehension, child temperament, and parental age was controlled. Similar associations have been reported for older children (7-12 year olds) as well (Bock et al. 2014). Studies investigating the links between ToM and components of EF in various cultures have also found a significant relationship between the two abilities (Chasiotis, et al. 2006; Sabbagh et al. 2006; Evren and Yagmurlu 2014; Wang et al. 2016).

Some aspects of EF such as inhibition control relate strongly to ToM development whereas others (like planning ability) do not show any significant relation. Carlson and Moses (2001) investigated the link between inhibition control and ToM in a sample of 107 pre-schoolers. The findings revealed a significant relationship between ToM and inhibition task after controlling for the effect of multiple covariates such as age, gender, verbal ability, and family size. Similarly, Carlson et al. (2004) found that inhibition control was significantly related to ToM, whereas planning ability was not. Furthermore, recent studies indicated that EF abilities can predict ToM ability at a later age. A longitudinal study that investigated the concurrent and predictive relationship between EF and Tom, reported a significant correlation at 3 and 4 years of age, and predictive analysis revealed that EF at 2 and 3 years significantly predicted ToM at 3 and 4 years respectively (Muller at al. 2012). However, ToM at ages 2 and 3 did not explain variance in EF at age 4. Likewise, Flynn (2007) also reported that early inhibition control predicted

later ToM, but not vice versa. In sum, a strong relationship between EF and ToM exists across ages and cultures. Investigating EF therefore becomes more important to understand the differences in ToM development of Pakistani children in the current research.

A positive relation between sociometric status and self-perceived acceptance was found in Study 1. This indicated that children's own perception of acceptance received from the group matched the actual acceptance received from the group (indicated by their sociometric status). It was therefore decided to retain only sociometric status as a measure of peer acceptance in the second study. Furthermore, research studies show a strong influence of aggression and pro-social behaviour on peer acceptance. Children who appear to be more popular in peer groups exhibit high levels of pro-social behaviour and low levels of aggression, whereas rejected children show higher levels of aggression and low levels of pro-social behaviour (Bukowski and Newcomb 1984; Slaughter et al. 2002). Pro-social behaviour is often considered a component of a larger construct of social competence (Imuta et al. 2016). In other words, children who are socially competent exhibit more pro-social behaviours and are liked by their peers. Therefore, in the second study social competence is measured in terms of sociometric status and pro-social/antisocial behaviours.

A positive direction of relationship between social competence and ToM has often been reported in literature. For example, Bosacki and Astington (1999) tested links between ToM and social competence in a sample of 128 preadolescents. They found that ToM positively related to peer reported social skills, but not to the measures of peer popularity. Capage and Watson (2001) investigated ToM and social competence in a sample of preschoolers and found that ToM was significantly associated with social competence after controlling for the effects of age, language comprehension, and aggression. Similarly, Charman et al. (2001) reported that parental ratings of social competence showed a significant correlation with ToM and EF for typically developing children but not for children with ADHD. In a longitudinal study, Eggum et al. (2011) investigated concurrent and predictive links between ToM and pro-social orientation in a sample of 172 children at 3 time

points; when children were 42, 54, and 72 months of age. They found that ToM at 42 months of age related to pro-social orientation concurrently, as well as 18 months later. Razza and Blair (2009) also conducted a longitudinal study and found that the false belief understanding in preschool was positively associated with social competence in kindergarten, and social competence in preschool was positively associated with false belief understanding in kindergarten. Based on these findings they concluded that there was a bidirectional association between false belief understanding and social competence. Furthermore, the findings of a recent meta-analysis revealed that ToM understanding was associated with pro-social behaviour in 2-12 year olds, indicating that children who score high on ToM understanding also receive high ratings on measures of pro-social behaviours (Imuta et al. 2016).

In sum, ToM has been positively associated with measures of EF and social competence in western cultures. Keeping in view that variations have been noted in ToM development in different cultures, it is possible that the links reported between ToM, EF, and social competence may also vary in non-western cultures. Based on this proposition the intention here was to test how ToM related to EF and social competence (peer acceptance and pro-social/antisocial behaviours) among young Pakistani children.

3.3.1 Aims and Objectives

The current research aimed to investigate ToM development in 5-8-year-old Pakistani children. One objective of the study was to examine the age at which children could perform above chance on ToM tasks. The second aim of the study was to investigate whether the links between EF and ToM reported in Western and Chinese cultures also hold true for Pakistani children. Finally, the study aimed to assess how ToM related to children's social competence, as measured by peer acceptance and pro-social/ antisocial behaviours in a culturally different sample.

3.3.2 Method

3.3.2.1 Participants

The participants for the present study were selected from four different schools in Rawalpindi, Pakistan. A total of 150 children (78 girls and 72 boys) with the age range of 5-8 years (M=6 years and 4 months) were tested. Only those children who had parental consent for participation took part in the study.

3.3.2.2 Exclusion Criteria

Those children who were unable to comprehend Urdu language or were identified as difficult or problematic by their respective teachers were not included in the study.

3.3.2.3 Design

The study used a mixed design with between participant measure (Age) and within participant measures (ToM, EF, and SC). Each child received four ToM tasks, five EF tasks, and one social competence task. Presentation of the tasks was counterbalanced to prevent order effects. Teachers were requested to provide ratings on 'Multisource assessment of Social Competence' for each child. Three tasks for ToM (desire, emotion, FB content) were the same as used in Study 1. The deception task from Study 1 was replaced with FB location task.

FB Location Task: the FB location task was adapted from Sally-Anne test (Baron-Cohen et al.1985). Instead of dolls, two toy characters (teddy bears) were used in current study. The participants were told a story in which character 'A' puts two red marbles in a green box in presence of character 'B' and then goes out to play. In A's absence, B takes the marbles out of green box and puts them in the blue box. After a while A comes back and wants his/her marbles. The participant was then asked where would 'A' look for his/her marbles, in the blue box or in thee green box. In order to exhibit an understanding of FB the child must be able to inhibit his/her own knowledge (that the marble had been moved to blue box) and report the belief of the character (the marble is in green box).

The following five tasks were used to assess executive functioning.

1. Day and night Stroop task: this task included a picture of moon representing night and a picture of sun representing day. The participant was instructed to say night when he/she was shown the picture of sun, and day when shown the picture of moon. The pictures of moon and sun were presented in a fixed order to each participant. This task was used as a measure of inhibition control. The participant is required to inhibit a compelling verbal response (saying night after viewing the picture of moon and stars) and come up with the alternate response.
2. Peg-tapping task: The participant was provided with a wooden peg and was instructed to tap once on the table when the experimenter tapped twice, and tap twice when the experimenter tapped once. Each participant was given 16 test trials. This task was used as a measure of inhibitory control as the participant had to inhibit his/her motor reaction, and react in an opposing way.
3. Dimension change card (DCC) sorting task: the participant was shown two target cards that had two dimensions (colour: yellow/red, and shape: car/flower). The participant was then given a set of 16 cards and was instructed to sort the cards according to one dimension (e.g. colour first). When the participant was half way through (after sorting 8 cards) he/she was instructed to sort cards according to shape. The cards in the set provided to the participant were placed in a fixed order for each combination of target cards. For example, if the target cards were yellow car (YC) and red flower (RF), the cards in the set were placed as yellow flower (YF), red car (RC), YC, RF, RC, YF, RF, YC, RC, YF, YC, RC, RF, YF, RF, and YC. While determining the order in which cards would be placed in the set, caution was taken to assure that after sorting 8 cards, both the dimensions (object: car/flower, colour: red/yellow) were represented as targets. In addition, it was made certain that cards with equal number of both dimension were included for each set of sorting. For example, for colour sorting 4 yellow and 4 red cards were included, and for shape sorting 4

flowers and 4 cars were included. The task was used as a test of participant's cognitive flexibility and the ability to change response according to the new dimension.

4. Bear/dragon task: the participant was presented with two toys, a 'good bear' and an 'evil dragon', and instructed to follow the directions of bear, but not the dragon. The bear and dragon gave simple instructions like 'touch your eyes' or 'clap your hands'. Each participant was given 16 test trials. This task also measured inhibition control.
5. Luria's hand task: In this task the participant was instructed to make a fist when the experimenter pointed a finger, and to point a finger when the experimenter made a fist. Each participant was given 16 test trials. The presentation of 'fist' or 'finger' was random. This task also measured inhibition control.

The following tasks were used to assess social competence:

6. Sociometric Status Task: For sociomteric status, the rating method was used. Each participant was told the names of all his/her class fellows (one by one) and was asked whether they liked or disliked them.
7. Multisource Assessment of Social Competence Scale (MASCS): originally developed by Junttila and colleagues (2006), MASCS measures pro-social and antisocial dimensions of social competence. The items on the scale cover 4 factors; Co-operating Skills (e.g., offers help to other students), Empathy (e.g., is sensitive to the feelings of others), Impulsivity (e.g., acts without thinking) and Disruptiveness (e.g., teases and makes fun of other students). The first two factors (Co-operating Skills and Empathy) are a part of the pro-social dimension of MASCS. Whereas the antisocial dimension is comprised of the Impulsivity and Disruptiveness factors. The teacher form of MASCS was used in the current study. The Cornbach's Alpha Reliability of pro-social subscale for the current sample was .882 and for antisocial subscale the alpha was .868. Both the subscales showed good range of internal consistency for the current sample (see Appendix A).

3.3.2.4 Materials

For the ToM assessment, a variety of stories and objects were used. A picture of a boy character and two pictures of snacks (carrot and cookie) were used for desire task. A clearly marked sweets box and a toy mouse was used for the content task. For the emotion task pictures of a boy/girl, and of a toy car/doll were used. The materials for the FB location task included two toy characters (teddy bears), two boxes (green and blue) and two red marbles. For the executive functioning tasks, a wooden peg, cards with pictures of day and night, cards with pictures of red/yellow cars and red/yellow flowers and two toy characters (a bear and a dragon) were used. For social competence MASCS forms were given to the teachers to fill in and separate sheets that had the names of all the students in participant's class was used for ratings of sociometric status. A response sheet designed by the researcher was used to record the responses of respondents on different tasks.

3.3.2.5 Procedure

An ethical approval (E264) for conducting this study was provided by the Chair of the Humanities, Social and Health Sciences Research Ethics Panel at the University of Bradford. The Administrators of six schools were contacted and briefed about the research. Data was collected from four schools that were willing to participate in the study. Class teachers were given consent forms and information sheets to be sent to parents. Each child was tested individually in a quiet area of the school's activity room. Teachers were provided the MASCS forms for each child and were requested to fill in and return the forms a week later.

Three tasks of ToM (desire, emotion and content) and the measure of peer acceptance (sociometric status) were the same as used in Study 1. The following new tasks were used to measure ToM, EF and social competence.

1. False belief (location): (Wimmer and Perner 1983) the materials for this task included two toy characters (teddy bears), two different coloured (blue and green) boxes and a red marble. The participant was told a story in which

character ‘A’ was playing with two red marbles but had to go out for a while. Before leaving ‘A’ puts the marbles in the ‘green box’ in presence of character ‘B’. In A’s absence B takes the marbles out of the ‘green box’ and puts them in the ‘blue box’. After a while A comes back and wants his/her marbles. The participant was then asked where would A look for his/her marbles first, in the ‘green box’ or ‘in the blue box’. The participant’s answer was noted on a response sheet designed by the experimenter.

2. Day and Night Stroop task: the participant was first shown two cards, one with a picture of moon (representing night) and the other with a picture of sun (depicting day). In order to familiarise the participant with the cards, the experimenter asked questions such as, what is this (pointing to the moon/sun), and when does moon/sun rise, in day or night. After the participant was familiarised with the picture cards, he/she was told that the experimenter was now going to play a game with them. The experimenter gave the instructions for the game, ‘In this game when I show you the night card (shows the card with moon) you will have to say ‘day’ and when I show you the day card (shows the card with the picture of sun), you will have to say ‘night’. After the instructions, the experimenter gave the participant two practice trials to make sure he/she understood what was required of him/her. If the participant made mistake in the practice trials the experimenter demonstrated what the participant was supposed to do. Each participant was given 16 test trials and the cards were presented in a fixed order.
3. Peg-tapping task: the participant was shown two wooden pegs one of which was given to the participant and other remained with the researcher. The participant was told that the experimenter would use the wooden peg to tap on the table either once or twice. The participant was instructed that if the experimenter tapped once the participant should tap twice, and if the experimenter tapped twice the participant should tap once only. After the instructions, the researcher demonstrated how the game works and gave

the participant two practice trials. Each participant was given 16 test trials and the order of tapping was random.

4. Dimension change card (DCC) sorting task: this task included 8 cards with pictures of cars (4 red cars and 4 yellow cars) and 8 cards with pictures of flowers (4 red flowers, 4 yellow flowers) on it. Before the task started, the participant was shown a red and a yellow block and asked to name the colours of the blocks. This was done in order to rule out color blindness in any of the participants. In the task, the participant was shown two target cards, either a yellow car and a red flower or a red car and a yellow flower. The presentation of target cards was alternated. The participant was then familiarised with the cards by asking questions such as, 'Can you tell me, what is this on the card? Yes, a car/flower, and can you tell me what color is it?' After familiarisation, the target cards were placed side by side in front of the participant, and he/she was given a set of 16 cards. At this point the participant was instructed to sort the cards according to one dimension (e.g., colour). When the participant was half way through (after sorting 8 cards) she/he was instructed to sort cards according to the second dimension (e.g., shape).
5. Bear/dragon task: the participant was introduced to two toys, a 'good bear' and an 'evil dragon'. The participant was told that both the bear and dragon would be giving certain directions to him/her. However, the participant was instructed to only follow the directions of the bear, and not to follow those of the dragon. The bear and dragon gave simple instructions like 'touch your eyes'. Participants were given 16 test trials.
6. Luria's hand task: In this task the participant was instructed to make a fist when the experimenter pointed a finger, and to point a finger when the experimenter made a fist. Participants were given 16 test trials.
7. Sociometric Status Task: the procedure used for sociometric status was the same as used in Study 1.

8. A test of social competence (Multisource assessment of social competence) was given to the teachers and they were requested to rate each participant on the behaviours mentioned in the scale.

3.3.3 Results

The study was designed to investigate ToM development in young Pakistani children. In addition, it also aimed to examine the links between ToM understanding, EF, and social competence. For this purpose, 150 children were given four ToM tasks, five EF tasks, and one sociometric task. Teachers provided ratings of social competence through MASCS. One-sample t-tests were conducted to find out the difference between expected and observed mean scores on overall ToM score for each year of age. A series of One-sample t-tests was also conducted to test the difference between the mean score expected by chance and the observed mean value of participants on individual tasks of ToM at each year of age. Pearson correlations were carried out to test the association between ToM, EF and social competence.

3.3.3.1 Scoring

ToM tasks were scored as 1 for a correct answer and 0 for an incorrect answer. A total score for ToM was computed by adding scores on all 4 ToM tasks. The total score for ToM tasks ranged from 0 to 4. EF tasks were also scored as 1 for a correct response and 0 for an incorrect response. There were 16 trials for each task so the total score for each task was the sum of scores on 16 trials. The total score of EF was a sum of total scores on 5 tasks of EF. The possible range for total EF score was 0- 80. Positive ratings received by each participant were aggregated and converted to percentages to provide a score for sociometric status (0-100).

For MASCS, a score of 1-4 was given for each statement where 1 represented ‘never’ (exhibit that behavior) and 4 represented ‘frequently’ (exhibit that behavior). Scores were calculated for pro-social (8 items) and antisocial (7 items) dimensions separately. For pro-social subscale, the possible range of the scores was 8-32 and for antisocial subscale the range was 7-28.

3.3.3.2 Demographics and Preliminary Analysis

This section of results includes main demographics such as age and gender for participants. It also includes preliminary analysis in terms of Mean, SD and ranges for different measures of ToM, EF and social competence.

Table 9. Age and gender of Participants

	Age (in years)			Gender	
	Mean	S.D	Range	F	M
Total Sample (N=150)	6.48	1.12	5.00-8.00	78 (52%)	72 (48%)

Table 9 indicates that the age range of participants was 5-8 years (*M*=6.48, *SD*=1.12). The frequency of female and male participants was 78 (52%) and 72 (48%) respectively.

Table 10. Mean and Standard Deviation of ToM tasks (N=150)

Tasks	Mean	(St. Dev)
ToM emotions (0/1)	.33	(.47)
ToM Desire (0/1)	.63	(.48)
ToM Unexpected Content (0/1)	.33	(.47)
ToM Unexpected Location (0/1)	.49	(.50)
ToM Total (0-4)	1.7	(1.14)

Table 10 presents the mean scores on the different ToM tasks and the total ToM value, which is the sum of scores on four tasks. The mean score on the desire task was the highest (*M*=.63, *SD*=.48), followed by the unexpected location task (*M*=.49, *SD*= .50). This was followed by the emotions task (*M*=.33, *SD*= .47), and the unexpected content task (*M*=.33, *SD*= .47) respectively. The mean of the total score is 1.7 (*SD*= 1.14), which indicated that on average participants passed less than 2 tasks.

Table 11. Mean and Standard Deviation of EF tasks (N=150)

Tasks	Mean	(St. Dev)	Range
Day and night Stroop task	12.93	(4.76)	0-16
Peg tapping task	12.51	(3.70)	0-16
Dimension card sorting task	13.71	(3.23)	7-16
Hand task	13.58	(4.15)	0-16
Bear-Dragon task	12.99	(3.54)	0-16
EF Total	65.80	(11.31)	33-80

Table 11 presents the mean scores on individual EF tasks and the total EF Score, which is the sum of scores achieved on five EF tasks. The highest mean score was on the dimension card-sorting task (*M*=13.71, *SD*=3.23), followed by the hand task (*M*=13.58, *SD*=4.15). This was followed by Bear-Dragon task (*M*= 12.99, *SD*=3.54), and the Day and night Stroop task (*M*=12.93, *SD*=4.76). The Peg tapping task had the lowest mean score (*M*=12.51, *SD*=3.70).

Table 12. Mean and Standard Deviation of Sociometric Status (N=150)

	Mean (St. Dev)	Range
Sociometric Status	65 (22)	0-100

The mean score for sociometric status was 65 and the range was 0-100 (see Table 12). This range indicates that some participants were rated as disliked by all their class fellows (hence a score of 0%) whereas others were rated as liked by all their class fellows (hence a score of 100%).

Table 13. Mean and Standard Deviation of MASCS subscales (N=150)

	Mean (St. Dev)	Range
Pro-social (0-32)	21.84 (5.18)	9-32
Antisocial (0-28)	12.43 (4.30)	7-28

On the subscales of MASCS the mean score was 21.84 (*SD*=5.18) for the pro-social dimension and 12.43 (*SD*= 4.30) for the antisocial dimension (see Table 13).

3.3.3.3 Main Analysis

This section includes the results of One-Sample t-tests that were used to analyse the difference between the actual mean scores of the participants and mean scores expected by chance on ToM tasks for different age groups. In addition it also includes findings from partial correlation between the variables (ToM, EF and SC).

Table 14. Results of One-Sample t-test and Descriptive Statistics of Total ToM Scores for Different Age Groups

	Mean	*SD*	*t*	*df*	*p*
5 year olds (N=40)	.95	.90	-7.34	39	.000
6 year olds (N=34)	1.56	.86	2.99	33	.005
7 year olds (N=40)	2.13	1.06	.74	39	.463
8 year olds (N=36)	2.53	1.03	3.00	35	.005

The range of total score for ToM tasks was 0-4, therefore 2 was specified as test value. The results of One- Sample t-test presented in table 14 indicated that the mean score (*M*=.95, *SD*=.90) of 5-year-olds was significantly different than the expected mean score; *t(39)*=-7.34, *p*=0.000. Likewise, the mean score (*M*= 1.56, *SD*=.86) of 6-year-olds was also significantly different than the expected mean; *t(33)*=2.99, *p*=0.005. These results suggested that the performance of both these groups was significantly lower than would be expected by chance. There was no significant difference in the observed and expected mean scores (*M*= 2.13, *SD*= 1.06) of 7-year-olds; *t(39)*=.74, *p*=0.463, indicating that the performance of this

group was no better than would be expected by chance. However, 8-year-old participants' observed mean score (*M*= 2.53, *SD*= 1.03) was significantly different than the expected mean value of 2; (35)*t*=3.00, *p*=0.005), suggesting that the 8-year-olds performed better than would be expected bychance.

One-Sample t-tests were also conducted for individual ToM tasks to analyse the difference between observed mean scores of the participants and the scores that would be expected by chance. Since the tasks were scored as 0 or 1, .5 was specified as the mean value expected by chance.

Table 15. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 5-year-olds (N=40)

	Mean	*SD*	*t*	*df*	*p*
Desire	.45	.50	-6.28	39	.534
Content	.18	.38	-5.34	39	.000
Emotion	.10	.30	-8.32	39	.000
Location	.23	.42	-4.11	39	.000

The results of One-Sample t-tests in Table 15 indicated no significant difference in the observed and expected mean score (*M*=.45, *SD*=.50) of desire task; *t(39)*=-.28, *p*=0.534, for the 5-year-olds. This suggested that the performance of 5-year-olds on desire task was no different than would be expected by chance. On the contrary, there was a significant difference in the observed and expected mean values (*M*=.18, *SD*=.38) of content task; *t(39)*=-5.34, *p*=0.000. The expected and observed mean scores (*M*=.10, *SD*=.30) of emotion task were also significantly different; *t(39)*=-8.32, *p*=0.000. Likewise, a significant difference existed in the observed and expected mean score (*M*=.23, *SD*=.42) of location task; *t(39)*=-4.11,

p=0.000. These results suggested that the performance of 5-year-olds on content, emotion and location tasks was worse than would be expected by chance.

Table 16. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 6-year-olds (N=34)

	Mean	*SD*	*t*	*df*	*p*
Desire	.62	.49	1.39	33	.174
Content	.26	.44	-3.06	33	.004
Emotion	.15	.35	-5.72	33	.000
Location	.53	.50	.339	33	.737

The results of One-Sample t-tests presented in table 16 indicated that there was no significant difference in the observed and expected mean scores (*M*=.62, *SD*=.49) of 6-year-olds on the desire task; *t(33)*=1.39, *p*=0.174. Likewise, no significant difference was found in the observed and expected mean score (*M*=.53, *SD*=.50) of false belief location task; *t(33)*=.339, *p*=0.737. These results indicated that the performance of 6-year-olds on the desire and false belief location task was no different than would be expected by chance. However, the observed mean score (*M*=.15, *SD*=.35) of emotion task was significantly different than the expected mean value; *t(33)*=-5.72, *p*=0.000.Similarly a significant difference was found in the observed and expected mean scores (*M*=.26, *SD*=.44) of the content task; *t(33)*=-3.06, *p*=0.004. This indicated that the performance of 6-year-olds on emotion and content task was worse than would be expected by chance.

Table 17. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 7-year-olds (N=40)

	Mean	*SD*	*t*	*df*	*p*
Desire	.75	.43	3.60	39	001
Content	.38	.49	-1.61	39	.115
Emotion	.43	.50	-.947	39	.349
Location	.58	.50	.947	39	.349

According to the results presented in table 17, the observed mean score (*M*=.75, *SD*=.43) of 7-year-olds on desire task was significantly different than the expected mean value; *t(39)*=3.60, *p*=0.001). This indicated that the 7-year-olds performed better than would be expected by chance on desire task. However, there was no significant difference in the observed and expected mean scores (*M*=.38, *SD*=.49) on content task; *t(39)*=-1.61, *p*=0.115. Likewise, no significant difference was found in the observed and expected mean scores (*M*=.43, *SD*=.50) of emotion task; *t(39)*=-.947, *p*=0.349. Furthermore the observed and expected mean scores (*M*=.58, *SD*=.50) of false belief location tasks were also not significantly different; *t(39)*=.947, *p*=0.349. These results indicated that the performance of 7-year-olds on content, emotion and false belief location tasks was no different than would be expected by chance.

Table 18. Results of One-Sample t-test and Descriptive Statistics of individual ToM tasks for 8-year-olds (N=36)

	Mean	*SD*	*t*	*df*	*p*
Desire	.69	.46	2.49	35	.017
Content	.53	.50	.329	35	.744
Emotion	.64	.48	1.71	35	.096
Location	.67	.47	2.09	35	.044

The results of One-Sample t-test presented in table 18 indicated that the mean score (*M*=.69, *SD*=.46) of 8-year-old participants was significantly different than the expected mean value on desire task; *t(35)*=2.49, *p*=0.017. Likewise, a significant difference was found in the expected and observed mean score (*M*=.67, *SD*=.47) of location task; *t(35)*=2.09, *p*=0.044. These results suggested that the 8-year-olds performed better than would be expected by chance on desire and false belief location tasks. However, the mean score (*M*=.53, *SD*=.50) of 8-year-olds was not significantly different than the expected mean score on content task; *t(35)*=.329, *p*=0.744. Similarly no significant difference was found in the expected and observed mean scores (*M*=.64, *SD*=.48) of 8-year-olds on emotion task, *t(35)*=1.71, *p*=0.096. These results indicated that the performance of this age group on content and emotion tasks was no different than would be expected by chance.

Table 19. Partial correlation between ToM, EF, subscales of MASCS and Sociometric Status after controlling for the effect of age (N=150)

	EF	Pro-social	Antisocial	Sociometric status
ToM	.374***	.282**	-.177*	.119
EF	-	.083	-.146	.251*
Pro-social	-	-	-.091	.374***
antisocial	-	-	-	-.119

*Correlation is significant at p<0.05, **Correlation is significant at p<0.01, ***Correlation is significant at p<0.001

Table 19 indicates that ToM had a significant positive correlation with EF (*r*=.374, *p*= .000) and the pro-social dimension of MASCS (*r*=.282, *p*= .001) after controlling for the effect of age. In contrast, there was a significant negative correlation between ToM and the antisocial dimension of MASCS (*r*=-.177, *p*= .030). EF appears to have a significant positive relationship with sociometric status (*r*=.251, *p*= .002), and sociometric status was positively associated with pro-social behaviour (*r*=.374, *p*= .000).

3.3.4 Discussion

The research was carried out to investigate ToM development in Young Pakistani children. In addition, the association between TOM, EF, and social competence was also investigated in a sample of 150 children between the ages of 5-8 years. The participants were tested on four ToM tasks and five EF tasks. Social competence was measured in terms of peer acceptance and teachers' ratings of pro-social and antisocial behaviours of the participants. Based on the existing literature it was hypothesised that Pakistani children would show a delay in acquisition of ToM, compared to the expected age reported in Western literature. Furthermore, it was expected that there would be a positive association between ToM and EF, as previously reported across cultures. Similarly, as indicated by literature, a positive link between ToM and SC was also expected.

With reference to ToM development, the findings of Study 2 replicated the findings of Study 1. On overall score of ToM, 5-year-olds performed worse than chance whereas 6- and 7-year-olds performed at chance. However, in contrast to Study 1, the 8-year-olds in Study 2 performed better than would be expected by chance. This indicated that the change in ToM measures did not make much difference in terms of improving the performance on Tom understanding for the children younger than 8 years of age. Although the deception task (which majority of the children failed in Study 1) was replaced with a presumably easier false belief location change task, the overall performance on ToM tasks still did not improve for 5, 6 and 7-year-olds. For individual ToM tasks, the 5-year-olds performed at chance on the desire task and worse than chance on the content, emotion, and location tasks (as was also the case in Study 1 except for the content task, on which children performed at chance in Study 1). Furthermore, the transition from at chance to above chance performance was first made for the desire task (afain replicating findings from Study 1). However, this transition was made at 7 years in Study 2 as compared to 6 years in Study 1. This transition on the desire task was followed by transition from at chance to above chance performance on the location task at 8 years of age. As was the case in Study 1, the performance of 8-year-olds in Study 2 on the content and emotion tasks was still at chance.

The results of the Pearson correlation indicated a significant positive relationship between ToM and EF scores. This indicated that the children who had better executive functioning skills were also good at understanding mental states, and vice versa. These findings are in line with the previous literature from Western and Chinese cultures (Perner and Lang 2000; Carlson and Moses 2001; Moses 2001; Sabbagh et al. 2006; Bock et al. 2014). The current findings also provide support for the universality of the link between ToM and EF skills. Furthermore, EF also had a significant positive relationship with sociometric status. This indicated that children who had better executive functioning skills were more popular among their peers.

As far as the association between ToM and social competence is concerned, findings of the current study provide partial support for a positive link. A significant positive association was found between ToM and pro-social dimension of MASCS. This indicated that children who had an advanced ToM were ranked higher by their teachers on co-operative skills and empathy exhibited for peers. On contrary, a significant inverse correlation between ToM scores and antisocial subscale of MASCS indicated that children with a lesser understanding of mental states are ranked as impulsive and disruptive in their interactions with peers. The current findings on the association between ToM and pro-social behaviours are in line with previous literature from Western individualistic countries (Capage and Watson 2001; Charman et al. 2001; Razza and Blair 2009). A significant positive correlation between sociometric status and pro-social dimension of MASCS also indicated agreement between the teacher and peer ratings of the participants' behaviours. However, no significant association was found between ToM and peer acceptance/popularity. Furthermore, children's EF abilities were significantly associated with their peer acceptance. A possible explanation for this association is that EF skills allow children to inhibit their impulsive responses in different social situations and behave in a more acceptable manner. EF also facilitates emotion regulation in children, which leads to fewer conflicts with peers.

3.4 General Discussion

Two studies were carried out to assess the development of ToM among 5 to 8-year-old Pakistani children. Links between ToM, executive functioning, and social competence were also investigated in this sample. In recent years, research on ToM development has shifted focus from a universality perspective of ToM acquisition (Wellman et al. 2001) (where children develop the ability around 4 years of age across cultures) to a social constructivist perspective, which holds that development is more culture specific and influenced by social input (Carpendale and Lewis 2004). Several studies have reported cultural variations in time of ToM acquisition, as well as the sequence in which understanding of different mental states evolves (Naito and Koyama 2006; Liu et al. 2008; Shahaeian et al. 2011; Hughes et al. 2014). The findings of the present studies also corroborate the social constructivist view. Contrary to the commonly held idea that children pass FB tasks around 4 years of age universally (Wellman, et al., 2001), Pakistani children's performance in the current studies was no better than chance until 8 years of age. On overall ToM score 5 year olds performed worse than chance, 6 and 7 year olds performed at chance, and 8 year olds performed better than chance (but at chance in Study 1). These findings remained consistent across both studies for 5, 6 and 7-year-olds, despite replacing a difficult task (deception) with a seemingly easier one (FB location) in the second study. The performance of 8-year-olds, however, appeared to improve with the change made in the tasks in Study 2. These findings are in line with the previous studies that reported delays in development of mental understanding in collectivist cultures (Naito and Koyama 2006; Liu et al. 2008; Lecce and Hughes 2010; Nawaz et al. 2014). Wellman et al. (2001) argued that children develop ToM ability universally (they move from below chance to above chance performance with increasing age) but the time of acquiring ToM skills may vary in different cultures. The findings from both studies included in this chapter provide support for this argument.

In a previous study of ToM development in Pakistani children Nawaz et al. (2014) investigated the age at which children acquire an understanding of desire,

pretence, and FB. They found that children made a transition from below chance to at chance performance on the given tasks in their 5th year. The current studies extended the age, as well as the number of mental states, tested previously. Both the current studies replicated the findings of Nawaz et al. (2014) that 5-year-olds performed at chance for desire task. However, the performance of 5-year-olds was significantly worse than chance on all the other mental states that were included in the current study (emotions, FB location, FB content and deception). Children made a transition from at chance to above chance performance around 6th to 7th year of age on desire task, and in their 8th year on FB location task. Nevertheless, even in their 8th year, children performed at chance on FB content and emotions task and worse than chance on deception task. In the current studies the mental states associated with desire appeared to have been mastered earlier than other states investigated. After understanding of desire children performed better than chance on false belief tasks. Wellman and Liu (2004) found that children acquire understanding of different mental states in a specific predictable sequence. They proposed that children develop understanding of desire (people can have different desires) before the understanding of belief (people can have different beliefs about same object), which comes before understanding of knowledge access (means of acquiring knowledge such as seeing something vs. not seeing something). This is followed by False Belief understanding (people can have a belief that contradicts reality), and lastly understanding of hidden emotions (people can feel one way but show a different emotion). In accordance with this view, Ruffman et al. (2002) found that children talk about desires before they talk about beliefs and thoughts. Although in the present study we tested slightly different mental states than those mentioned in the sequence of propoed by Wellman and Liu (2004), the current findings indicated somewhat similar trend in Pakistani children. The mean score on desire task was highest followed by FB, emotion and deception task. In understanding of three mental states (i.e., desire, FB, and emotion), Pakistani children appear to be following a similar progressive sequence as proposed by Wellman and Liu (2004). This proposition gets further support from the findings

that children first showed above chance performance on desire task and then on FB location task.

There may be several explanations for the delay in ToM development found in the current studies. Existing research has provided some support to link socio-economic status (SES) with performance on FB tasks (Cutting and Dunn 1999; Cole and Mitchell 2000; Pears and Moses 2003). Although no information was gathered to assess SES of the participants in current studies, the schools were generally located in areas where the population was from lower socioeconomic class. Both studies were conducted in public schools, which have a very low fee structure, and is an affordable option for those who cannot pay hefty fees for private institutes. It seems probable that the participants were either from low or lower middle socioeconomic class. SES has been associated with marital stability, parent-child interactions, parenting style, child vocabulary, and language processing efficiency (Bradley and Corwin 2002; Conger and Donnellan 2007; Conger et al. 2010; Fernald et al. 2013). These factors can influence ToM development in children to some extent. ToM has also been linked with larger families in terms of number of siblings. Perner et al. (1994) found that children with at least two siblings performed better on ToM tasks when compared with children who had no siblings. Pakistan is a collectivist society where families usually live in close proximity, often as joint families with grandparents, aunts, uncles, and their children living under one roof. However, the sample in current studies was collected from the cities of Islamabad (the capital) and Rawalpindi, which are home to many nuclear families that have migrated from their villages for better job opportunities. It is possible that the participants for current studies belonged to smaller nuclear families. However, nuclear family units are more in line with the Western samples exhibiting early ToM development and cannot fully explain the delay in ToM development found in Pakistani children.

In addition to family size, ToM has also been linked to several parental factors in recent years. For instance, maternal education was found to be a strong predictor of child ToM in a sample of 142 pre-schoolers (Pears and Moses 2003). It has been argued that maternal education can impact ToM in two possible ways.

Firstly, it can influence ToM indirectly by its association with general cognitive development of the child. Secondly, educated mothers tend to provide more causal explanations for the social phenomenon than the uneducated mothers, which can directly influence the child's mental state understanding (Pears and Moses 2003). Pakistan is a low-income country with a low literacy rate. According to a report of UNESCO (2003) the literacy rate in Pakistan (reported in the last census carried out in 1998) was 44% in the overall population, 63% in urban areas, and 34% in rural areas. Although in larger cities like Islamabad and Rawalpindi, the literacy rate is comparatively high, people who migrate from rural areas often come with very little or no education. Furthermore, females are at a greater disadvantage than males when it comes to education in Pakistan. Thus, the level of maternal education could possibly be linked to children's ToM development in Pakistan. Another factor that has been associated with ToM is the style of parenting. Research indicates that parenting characterised by high levels of control and low levels of warmth and responsiveness (authoritarian parenting) has negative effects on ToM development (Hughes et al. 1999). On the other hand, authoritative parenting style associated with high levels of responsiveness and control has been associated with more advanced ToM in children. O'Reilly and Peterson (2014) found that ToM sores had a negative relation with authoritarian, and a positive relation with authoritative parenting styles, after controlling for the influence of age and verbal ability. It has also been reported that Asian parents practice more authoritarian parenting style compared to American and European parents (Dornbusch et. al. 1987; Leung et al. 1998; Vinden 2001). It is postulated that the parenting techniques used by Pakistani parents could also be linked to the delay in ToM development found in the current studies.

Other than social factors there may also be cognitive explanations related to ToM performance. Wellman et al. (2001) pointed out two important factors for passing any cognitive ability test. Firstly, passing a test requires competence which is the conceptual understanding necessary for solving a problem; and secondly there is performance factor which includes other cognitive skills required such as memory, comprehension, attention etc. It has been proposed that children fail

these tasks not because they lack the conceptual competence but because they lack other cognitive skills required for passing the tests. An important set of cognitive skills associated with ToM tasks is EF (Carlson and Moses 2001; Carlson et al. 2004; Hughes and Ensor 2007). Studies have shown strong concurrent and predictive associations between EF and ToM ability. Furthermore, it has been proposed that EF can influence the emergence or the expression of ToM (Russell 1996). The emergence account postulates that EF is a pre-requirement for attaining mental state understanding, whereas the expression account suggests that EF facilitates the expression of a pre-existing ToM ability. In both cases a specific level of EF abilities is crucial to pass ToM tasks. There is a possibility that Pakistani children's EF abilities develop at a different pace than Western children and can explain the lag in Pakistani children's performance on ToM tasks.

Other than ToM development in Pakistani children, the current studies also aimed to investigate how mental state understanding links to children's social competence. One indicator of social competence measured in the studies was peer acceptance or popularity in peer group. In Study 1, peer acceptance was measured in terms of sociometric status and self-perceived peer acceptance. Both the measures correlated positively with each other but no significant relation was found with ToM. Due to the positive correlation between sociometruic status and self-perceived peer acceptance only one measure of peer acceptance (sociometric status) was retained in Study 2. Study 2 replicated the findings of Study 1 in that no association was found between peer acceptance and ToM. Our findings are in line with the studies that reported no significant relation between ToM and peer acceptance (Watson et al. 1999; Badenes et al. 2000), but in contrast with those who found a positive association between the two (Peterson and Siegal 2002; Cassidy et al. 2003).

In addition, there was no significant difference in the performance of popular and less liked children on ToM tasks. This was even though less liked children performed significantly worse on EF measures compared to popular children. The findings that popular and less liked children performed similarly on ToM tasks indicated that both appear to have similar ability to understand mental states.

However, Badenes et al. (2000) argued that negative experiences in the lives of peer-rejected children might affect their ToM understanding in that they might develop a theory of 'nasty minds'. The expression 'nasty ToM' refers to behaviours requiring antisocial use of ToM (such as deception) and was first proposed by Happe and Frith (1996) for children with conduct disorder. 'Nice ToM' on the other hand refers to using mental understanding for pro-social behaviours. This hypothesis is also validated by a significant difference on pro-social behaviours of popular and less liked children found in Study 2. The less liked children were rated significantly low on pro-social behaviours by their teachers. It is possible that popular and less liked children have similar abilities to understand mental states, however they use it in different contexts (pro-social or antisocial).

Some limitations of the study are that the performance of Pakistani children was only compared with existing literature and no comparison group was included. The findings might be slightly different if Pakistani children's performance is directly compared with a Western sample on similar tasks. Such a comparison would also allow comparing other cognitive (such as EF) and social factors that may account for variance in ToM acquisition. The sample was recruited from public schools and the findings cannot be applicable to children in private institutes. Furthermore, no information was gathered about other demographic (such as SES) or parental factors (such as maternal education or parenting styles) in the current studies.

3.5 Chapter Summary

In recent years research in the field of ToM has indicated that children from collectivist cultures perform differently on ToM tasks than children from individualist cultures (Liu et al. 2008; Wellman et al. 2011; Wang et al. 2016). To further probe this claim two research studies were designed to investigate ToM development in 5 to 8-year-old Pakistani children. In addition, universality of the links between ToM and social competence (indicated by peer acceptance and pro-social/antisocial behaviours) were also investigated in this population. Findings from both the studies provided support for variations in ToM development in different cultures. Pakistani children's performance on ToM tasks was at least three years delayed

when compared to existing Western literature. These findings were in line with the only published study of ToM investigation in Pakistani population that indicated a three years lag for understanding of desire in Pakistani children (Nawaz et al. 2014). Several possible explanations for this delay have been discussed. Regarding links between ToM and social competence, the findings provide some support for a positive link between mental state understanding and teacher's reports of pro-social behaviour. However, no significant associations were found between ToM and peer acceptance. Neither were there any differences in the performance of popular and less liked children on ToM tasks.

Chapter 4

Theory of mind and social competence in cultural context: comparison of Pakistani, British Pakistani and White British children

4.1 Introduction

Theory of mind (ToM), an ability to attribute different mental states to self and others, has been a prominent area of research in cognitive developmental psychology for last three decades. In Western literature it has been well established that most typically developing children acquire ToM ability around 4-5 years of age (Wellman et al. 2001). However, there has been a debate regarding whether this is due to a predetermined neurobiological maturational process, or a result of unique social and conversational experiences of children (Wellman et al. 2011). Subsequent research in the field indicated that variations in the understanding of others' minds could be attributed to a number of social factors such as: presence of siblings; language skills; and parent-child conversation (Perner et al. 1994; Ruffman et al. 1998; Ruffman et al. 2002; Meins et al. 2003; Ensor and Hughes 2008). These findings have kindled an interest in the sociocultural variations in development of ToM.

Some researchers have suggested a universal trend in the age of ToM acquisition across cultures (Callaghan et al. 2005; Sabbagh et al. 2006), whereas others have reported striking differences in the average age at which children exhibit an understanding of mind (Wellman et al. 2001; Naito and Koyama 2006; Liu et al. 2008; Hughes et al. 2014). For instance Callaghan and colleagues (2005) compared false-belief understanding across 5 different cultures (Canada, India, Peru, Samoa and Thailand) and found synchrony in the onset of mental state understanding, with children from all cultures passing false-belief tasks around 5 years of age. A similar trend was observed in another study that compared Chinese children with American (Sabbagh et al. 2006). These accounts argue that

cultural differences do not have much impact on the onset of ToM development; rather they contribute it to biological maturational processes or to experiences that are universal to different cultures (e.g. conversation or schooling).

Contrasting evidence comes from two meta-analytical studies. The first provided evidence of differences in ToM development within the Western cultures (Wellman et al. 2001). Specifically, the children from Canada and Australia performed better on false-belief understanding than children from the US and the UK, who in turn outperformed children from Austria and Japan. The second meta-analysis indicated a delay of up to two years in the timings of ToM development in Chinese children, when compared with children from North America (Liu et al. 2008). Liu et al (2008) argue that although ToM develops universally (in that Chinese and American children move from below to above chance performance during early childhood), it appears at different ages across cultures. Similar delays have also been reported for Japanese and Italian children (Naito and Koyama 2006; Hughes et al. 2014). Japanese children's performance on false belief tasks was considerably delayed when compared to Western literature and there were significant cultural differences in their reasoning about human actions. Japanese children attributed actions to behavioural and situational cues, rather than to individuals' mental states (Naito and Koyama 2006). In another study 5-6 year old British children outperformed their Japanese and Italian counterparts on ToM tasks (Hughes et al. 2014).

Several plausible explanations have been proposed to account for differences in ToM understanding across cultures. One attributes these variations to a general difference between collectivist and individualist cultures (Wellman and Liu 2004; Mayer and Trauble 2013). Another account refers to more specific cultural differences, such as conversational style or children's pedagogical experiences (Lecce and Hughes 2010; Hughes et al. 2014). The evidence for these arguments comes from studies comparing similar cultures such as Canada vs. America (both individualistic cultures), and those comparing dissimilar cultures such as Australia (individualistic) vs. Iran (collectivist) (Liu et al. 2008; Shahaeian et al. 2011).

The proponents of ‘collectivist vs. individualistic cultures’ argue that the understanding of others’ mind is influenced by cultural norms and attitudes (Ames et al. 2001). These two cultural orientations have been reported to influence numerous aspects of human thought and behaviour including sense of self, emotions, morality and interpersonal relationships (Triandis 2001). In collectivist cultures the desired outcome of development is interdependence whereas individualist cultures aspire to produce autonomous and independent individuals (Greenfield and Suzuki 1998). In collectivist cultures for example, there is a strong emphasis on conformity and obedience. One is expected to follow the norms of the society in order to gain approval of significant others. Any attempts to challenge authority are strongly discouraged and can have detrimental consequences for the individual as well as for the families. This emphasis on conformity and obedience in collectivist cultures could account for the variation of onset in ToM understanding in children (Mayer and Trauble 2013). Individualistic societies on the other hand promote independent thinking and an appreciation of diversity in opinions.

Wellman and Liu (2004) tested a broader range of mental states than just false belief understanding, and found that typically developing American children acquire understanding of other’s mental states in a consistent developmental progression. They suggested the following predictable sequence of ToM acquisition:

1. Diverse Desire (DD) – understanding that people can have different desires regarding the same object

2. Diverse Belief (DB) – understanding that people can have different beliefs about the same object

3. Knowledge Access (KA) – understanding different sources of knowledge; for example, a person’s knowledge about the contents of a container depends on whether he/she has seen the contents

4. False Belief (FB) – understanding that people can have a belief that

contradicts reality

5. Hidden Emotion (HE) – understanding that people can feel one emotion, but display a different emotion

Investigations into cultural differences in the progression of understanding found that the sequence of steps in American and Australian children was the same as mentioned above, however, Chinese and Iranian children demonstrated an understanding of KA before an understanding of DB (Shahaeian et al. 2011; Wellman et al. 2011). It is possible that these results are due to the distinction between collectivist and individualist cultures. In Chinese as well as Iranian cultures, parents emphasize acquisition of well-established knowledge and conformity, rather than encouraging children to develop their own ideas or to assert opinions freely (Shahaeian 2015). It is probable that the differences in sequence of ToM development observed in Chinese and Iranian cultures may be due to social upbringing and the role that families play in the lives of young children.

The above argument however, fails to explain differences within similar cultures such as Britain and Italy (individualist cultures), or Mainland China and Hong Kong (collectivist cultures). In a meta-analysis Liu et al. (2008) compared four cultural groups (Canada, US, Hong Kong and Mainland China) and found that children from Hong Kong lagged behind significantly on FB understanding when compared to their counterparts from Mainland China. Similar differences have also been reported in Western cultures. Lecce and Hughes (2010) compared 5-6 years old children from Britain and Italy (on first and second order FB and mixed emotions understanding) and found that British children outperformed Italian children on FB tests. These findings were corroborated by Hughes et al. (2014), who compared ToM scores for 6 year olds from Britain, Italy and Japan. British children's performance on ToM tasks was better than both Italian and Japanese children, whereas no significant difference was found between Italian and Japanese children.

Findings from above mentioned studies pose two challenges to the 'collectivist vs. individualist culture' hypothesis. First, how can differences between

similar cultures such as Britain and Italy, or Mainland China and Hong Kong, be explained? And second, the lack of expected difference between Italian (individualist) and Japanese cultures (collectivist) also require explanation. These ambiguities call for a different approach to explaining the cultural variations in ToM understanding.

In contrast to the broader view concerning general cultural differences, is the suggestion that the variations in mental state understanding result from more specific socially organized activities. Lecce and Hughes (2010) depicted several contrasts in the experiences of Italian and British Children, such as the form and function of parent-child talk, conversational styles of the children, and the variations between educational systems; that could possibly account for differences in ToM understanding. The findings of Hughes et al. (2014) also highlight the significance of formal schooling experience for understanding of mental states, as the British children, who outperformed the Italian and Japanese children on ToM tasks, start school at least a year earlier than children in Italy or Japan. Schools provide a unique opportunity to interact with peers, which may facilitate mental state understanding (Hughes and Dunn 1998). In addition to the timing of exposure to school environment, the differences in pedagogical strategies also appear to be linked to ToM development. Wang et al. (2016) tested the 'pedagogical experience' hypothesis by comparing children from two different pedagogical settings in Hong Kong; the local schools that emphasize acquisition of knowledge through repetitive practice approach, and the international schools that follow inquiry based approach and use English as the mode of instruction. They found that the children from local Hong Kong schools performed poorly on age appropriate ToM tasks when compared to British children, however the performance of children from international schools in Hong Kong was equivalent to those of British children.

Pakistani society, which is also a collectivist society, is similar to Chinese and Iranian in emphasizing conformity to existing norms, and discouraging independent ways of thinking in young children. The educational system of Pakistan also represents the cultural values of conformity by requiring children to

memorize and reproduce the text from books, rather than encouraging them to think for themselves (Sultana 2001; Jaffer 2005). In addition, the Pakistani education system is divided into three different categories; the public schools funded by government, local private schools, and international private schools. The public schools have minimum fee requirements, but the standard of education is very low, and therefore majority of the middle class population prefer to send their children to local private schools who charge significantly more than the public schools with a promise of better educational standards. The international private schools on the other hand follow British educational system, but are very costly and usually only cater to a limited elite class. Therefore the majority of children in Pakistan attend public schools or local private schools. Both these types of establishments stress the importance of following instructions and have heavy emphasis on acquiring knowledge through memorizing and repetitive practice, rather than on enhancing age appropriate skills.

Many Pakistanis have migrated to the UK and have been living there for generations. According to the 2011 national census of UK, British Pakistanis were the second largest ethnic minority in UK with a population of almost 1.2 million (Office for National Statistics 2011). It has been reported that individuals migrating from collectivist to individualist societies struggle to adjust to the new culture and that the parents attempt to preserve the second generation's sense of native culture (Bhugra 2004; Akiyama 2008). It can be therefore assumed that the children of these immigrants usually experience a traditional approach to Pakistani culture at home. The cultural aspects of Pakistani family life are maintained by parents at home. However, these children are exposed to British cultural values and life style outside the home. Most of these children will attend state schools that follow the Western individualistic approach to education. Therefore, these British Pakistani children experience a very different pedagogical environment than that of Pakistani children living in Pakistan. The majority of middle class Pakistani children go to local private schools that practice a teacher-lead approach to learning and children are considered passive receivers of information. Comparing these two populations (British Pakistani and Pakistani) provides a unique opportunity to test

the ‘collectivist vs. individualist culture’ hypothesis against the ‘pedagogical experience’ hypothesis. If children in collectivist cultures lag behind in the acquisition of ToM development, then the children of those British Pakistani migrants, who recreate and enforce their native cultural values, would probably show same trend as that of children living in Pakistan. On the other hand, the ‘pedagogical experience hypothesis’ would suggest that British Pakistani children who go to British schools and have the same educational experiences as White British children, would perform similar to White British children on ToM tasks. Therefore, the first aim of this study was to compare the performance of Pakistani, British Pakistani and White British children on ToM scale for possible differences in mental state understanding.

4.2 ToM and Executive Functioning

There is a strong empirical evidence to link executive functioning (EF) with ToM performance. This association has been reported across different age groups as well as in various cultures. For example, Carlson and Moses (2001) found a strong relationship between inhibitory control and ToM among 3-4 year old children after controlling for age, gender, verbal ability and family size. Beyond early childhood, Bock et al. (2014) found significant links between components of EF (cognitive flexibility) and ToM in middle childhood (7-12 year olds). With reference to culture, Chasiotis et al. (2006) tested pre-schoolers from three different cultural settings (Germany, Costa Rica and Cameroon) on measures of false-belief and inhibitory control. After controlling for age, gender, language, siblings and mother’s education they found a culture-independent relationship between conflict inhibition and false-belief understanding. Similarly in another study EF was found to be a significant predictor of ToM among institution-reared Turkish children (Evren and Yagmurlu 2014). The claims of links between EF and ToM are further strengthened by the findings of a recent meta-analysis of 102 studies including 9,994 participants between the ages of 3–6 years (Devine and Hughes 2014). According to the results of this meta-analysis the association between EF and false-belief understanding is consistent for children from different cultures and across various measures of executive functioning, but fluctuates across different types of false-

belief tasks. Furthermore, the findings indicated that early variations in EF predict later differences in false-belief understanding but not the other way around.

It has been proposed that EF can relate to ToM in two different ways, either by influencing the expression or the emergence of ToM (Russell 1996). The expression account suggests that EF assists in the expression of pre-existing ToM ability. In a FB task for example, a child is required to inhibit his/her own knowledge of true state of events in order to be able to report the mental state of the protagonist. In other words children fail ToM tasks not due to a lack of mental understanding, but due to the EF demands (such as inhibition control) of the tasks designed to measure ToM. Therefore, according to the expression account children with higher EF abilities will be able to perform better on ToM tasks. The emergence account on the other hand maintains that EF is a pre-requirement for acquiring ToM. It stresses that a certain level of executive ability must exist to enable a child to construct mental representations in the first place.

According to the expression account, children with higher EF abilities should perform better on ToM tasks. However, this is not always the case. In a study that compared Chinese and American pre-schoolers on executive functioning and ToM performance, it was reported that although the Chinese children outperformed their American counterparts on measures of EF, they were not as advanced on measures of ToM (Sabbagh et al. 2006). Similar results have also been reported by Wang et al. (2016) who compared 9-16 year olds from UK and Hong Kong on measures of EF and ToM. Children from Hong Kong outperformed British children on EF but performed worst on ToM. Such findings indicate that the variations in EF are not sufficient to explain the differences in ToM and cannot be described by the expression account. Wang et al. (2016) argue that these findings provide support for the emergence account. There is a need to further investigate the links between EF and ToM in different cultures to clarify the nature of this association. Therefore, a second aim of the current study was to test the universality of the link between EF and ToM in our samples from Pakistan and UK.

4.3 ToM and Social Competence

Social Competence (SC) is a multidimensional construct that encompasses different social, cognitive and emotional skills, all of which are crucial for effective social adaptation (Semrud-Clikeman,2007). These skills may involve, but are not limited to: social assertion, positive self-concept, adaptive behaviours, effective interpersonal interactions and popularity with peers (Dodge 1985). Higher levels of social competence in childhood has been associated with many positive outcomes in later life. For example, teacher-reported social competence in kindergarten was found to be associated with several academic, employment and mental health related outcomes 13 to 19 years later (Jones et al. 2015). Other studies have also found that socially competent children perform well academically (Birch and Ladd 1997), are better liked by their peers (Lindsey 2002), and show better behavioural adjustment in late childhood and early adolescents (Bornstein et al. 2010).

Considering that mental state understanding is crucial for social interactions, a large body of research has examined the relationship between social competence and ToM. Being able to understand that others have desires and beliefs that are independent and often contradictory of the real life setting, allows one to react more appropriately in different social situations. Hence, better ToM ability can facilitate in more competitive social activities. However, the research linking ToM to SC has surprisingly yielded contradictory findings. In an investigation of the relationship between ToM ability in preadolescents and their social competence reported by their peers and teachers, a significant positive link was found between preadolescents ToM scores and peers ratings of social-interaction skills (Bosacki and Astington 1999). However, there was no relationship between ToM and teachers' reports of social competence after controlling for the effect of children's vocabulary ability. Keskin (2005) tested 47 children on four measures of theory of mind, symbolic transformations in pretend play, and the Social Skills Rating Scale. He found no significant associations between children's performance on ToM measures and social competence as measured by the Social Skills Rating Scale. Similarly, no associations were found between false-belief

understanding and teachers' reports of social competence of children and adolescents with mental handicaps (Charman and Campbell 2002), or between ToM, and social competence among institution-reared children (Etel and Yagmurlu 2014).

On the other hand, a moderate positive relationship was found between measures of FB and teachers' ratings of social skills in young children (Watson et al., 1999). Similarly, Capage and Watson (2001) tested 51 pre-schoolers on two false belief tasks and used teachers' ratings of social competence and aggression. Children's performance on the false belief tasks was significantly related to social competence, after controlling for the effects of age and language. Similar findings have also been reported for older children. Higher-order ToM functioning was positively associated with teachers' ratings of social competence for 10-11 year olds (Liddle and Nettle 2006). Further support for the association between ToM and social competence comes from a meta-analysis of 76 studies including 6,432 children between 2-12 years of ages (Imuta et al. 2016). The findings of this meta-analysis revealed a significant association between ToM and pro-social behaviour and its subtypes (helping, cooperating, and comforting). This association was similar across gender; however, it was stronger for children 6 years and older. Despite the evidence for links between ToM and social competence, the direction of this association is yet not clear. In a longitudinal study, Razza and Blair (2009) found that false-belief understanding in preschool predicted social competence in kindergarten, and social competence in preschool predicted false-belief understanding in kindergarten. Their findings provide evidence for a bidirectional association between ToM and social competence.

EF has also been linked to SC in a number of studies. Huyder and Nilsen (2012) investigated links between children's executive functioning and SC by engaging them in an interactive puzzle task during a competitive and a co-operative context. It was noted that inhibitory control was related to fewer competent behaviours during a co-operative context. This indicated that inhibitory control allowed children to suppress socially inappropriate behaviours, which have the potential to damage a relationship and hinder the accomplishment of a shared

goal. Similarly, in a longitudinal study Razza and Blair (2009) found that preschool EF was positively associated with social competence both in preschool and kindergarten. Furthermore, in a previous experiment of the current research EF was positively related to sociometric status after controlling for age, which indicated that children with better EF abilities were more popular among their classmates.

To the present author's knowledge, the relationship between ToM and SC has not been investigated in a cross-cultural sample to date. Considering the established link between ToM and social competence it can be proposed that if British children outperform Pakistani children on ToM tasks, then they should also score significantly higher than Pakistani children on measures of social competence. However, there is a possibility that the sequence of ToM development and EF skills in children from a collectivist culture might affect their SC differently to those who come from an individualistic culture.

4.4 Aims and Objectives

The main aim of the current research was to investigate ToM development and its association with EF and SC in three different cultural contexts (Pakistani, British Pakistani, and White British). The first objective of the study was to test the collectivist VS individualistic culture hypothesis using Wellman and Liu's (2004) ToM scale. It was hypothesized that children from an individualistic culture (White British) will outperform children from a collectivist culture (British Pakistani and Pakistani). The study also aimed to test the pedagogical hypothesis: the children in Pakistan start school at the same age as children in UK, however, the pedagogical methods followed in both countries are different. If the age of starting school or the pedagogical methods are key to the acquisition of ToM, then both White British and British Pakistani children would perform similarly on ToM tasks, and Pakistani children would demonstrate a different pattern of abilities.

The second objective of the study was to test the universality of links between ToM and EF in cultural context. Although, there is strong evidence to support the link between EF and ToM from various cultures, most of the studies

have tested children living in their original cultures. This study provided a unique opportunity to compare children living in their original cultures (White British and Pakistani children) with those who have migrated to a foreign culture (British Pakistani children). This comparison can help to further the debate on the expression and emergence accounts of the link between EF and ToM.

Finally, we aimed to investigate the associations between ToM and social competence in different cultural groups. If the ability to understand others' mental states leads to better social skills, then children with high ToM ability should have comparatively better social skills. It was therefore, hypothesized that the group of children with advanced ToM skills would be rated higher on Social Competence by their teachers, as compared to the group who perform low on ToM tasks. An additional aim of the study was to determine whether ToM could predict Social competence or vice versa.

4.5 Method

4.5.1 Participants

A total of 279 participants between the ages of 4-7 years (M=5, SD= .86), from three cultural settings took part in the research. Eighty White British participants (53% female) and 108 British Pakistani participants (51% female) were selected from three schools in Leeds and Bradford, UK. Whereas 91 Pakistani participants (58% female) were selected from three schools in Rawalpindi, Pakistan. G-Power software suggested that at least 24 participants would give a power of 0.95 and an effect size of r=0.5 for an ANOVA analysis. Therefore, in each cultural group at least 24 children were tested in each year of age (i.e. 4, 5 and 6).

Regarding the parental ethnic background of the participants, of the White British participants, (out of 35 demographic forms returned) all but 2 (British Pakistani and British Indian) had White British fathers and all but 1 participant (Other White) had White British mothers. For British Pakistani sample, all the participants had British Pakistani parents. Fifty four per cent of British Pakistani participants had fathers who were born in Pakistan and later migrated to UK, and

74% participants had mothers who were born in Pakistan. All the parents of Pakistani participants were Pakistani nationals, born and raised in Pakistan.

4.5.2 Design

The study used a mixed design with between participant measures (Age and Culture) and within participant measures (ToM, EF, and SC). Each child was tested on a ToM scale (five tasks) and three EF tasks. The presentation of the tasks was counterbalanced to prevent order effects. Teachers were requested to provide ratings for social competence by filling in Multisource Assessment of Social Competence. The tasks were presented in Urdu for Pakistani children.

4.5.3 ToM Tasks

ToM scale (Wellman and Liu 2004) was used to measure ToM ability in children. The scale consisted of the following five tasks, which measured children's understanding of five different mental states:

1. Diverse Desires (DD): this task measured participant's ability to understand that people can have different desires than his/her own. Participants were required to choose a snack for a protagonist who was hungry. There were two snack options, one that was presumably more desirable for the child (cookie) and second one was less desirable (a vegetable, carrot). However, participant's preference was checked, in case they might have preferred a carrot over the cookie. In the task, the protagonist always preferred the snack that the participant did not like. The participant was then asked to select a snack for the protagonist. If the participant understood the protagonist's desires, then s/he should have selected the snack that the protagonist preferred, and not the one that s/he likes.

2. Diverse Beliefs (DB): this task assessed participant's understanding that people have different beliefs about physical world, and that their behaviours are directed by these beliefs. The task required participant to judge another person's behaviour when they did not know which of the two beliefs (their own vs. the character) was correct. The task introduced a situation where a protagonist had a different belief about a situation (whether a cat is in some

bushes or in an attic) than the participant's own belief. The participant was then asked to predict the protagonist's behaviour (i.e. where will the protagonist look for the cat?). If the participant understood that the protagonist had a belief different from his/her own beliefs, and would behave accordingly, then h/she would predict the protagonist's behaviour based on the protagonist's belief rather than his/her own belief.

3. Knowledge Access (KA): in this task the participant saw an object in a box and judged the knowledge of another person who had not looked inside the box. The participant was shown a nondescript box and asked what h/she thought was inside the box. The experimenter then opened the box and showed them a small toy mouse inside the box. The participant was then asked if another character (a toy) who had never looked inside the box, knew the contents of the box.

4. False Belief (FB): this task measured false-belief regarding the contents of a clearly marked sweets box that actually contained pens. If the participant understood the protagonist can have beliefs (in this case, there were sweets in the box) that contradict the reality (there were actually pens in the box), then h/she should be able to inhibit his/her own knowledge of reality and report the belief of the protagonist.

5. Hidden Emotions (HE): this task measured participant's understanding that people could feel one way, but express a different emotion. Participant was required to predict what emotion a child character (who was being made fun of) would exhibit if he/she did not want anyone else to know that he/she was sad.

4.5.4 EF Tasks

6. Day/Night Stroop task: this task was used in the second experiment detailed in the previous chapter (see chapter 3). The same pictures of day and night were used and the participant was instructed to say night when shown the

picture of day and to say day when shown the picture of night. Each participant was given 12 test trials.

7. Peg-tapping task: this task was also used in the second experiment (see chapter 3). The participant was provided with a wooden peg, and was instructed to tap once on the table when the experimenter tapped twice, and twice when the experimenter tapped once. Each participant was given 12 test trials of this task too.

8. Dimension Change Card Sorting (DCCS) task: this task was also used previously (see chapter 3). The participant was shown two target cards that had two dimensions; colour (yellow or red) and shape (star or a pentagon). The participant was then given 16 cards and was instructed to sort the cards according to one dimension (e.g. colour) first. When the participant was half way through the sorting task (after 8 cards) h/she was instructed to sort cards according to shape. The order in which the participant was instructed to sort the cards was counterbalanced.

4.5.5 Measure of Social Competence

Multisource Assessment of Social Competence Scale (MASCS), was used as a measure of social competence. The MASCS contained 15 questions divided into two subscales (i.e., pro-social and antisocial behaviour). The pro-social behaviour subscale consisted of 8 items and was further divided into two factors; co-operative skills (5items) and empathy (3 items). The antisocial behaviour subscale contained 7 items and was also further divided into two factors: impulsivity (3 items) and disruptiveness (4 items). For the current research, only the teacher version of MASCS was used. The Cornbach Alpha Reliability for the subscales of MASCS for the current sample ranged from .87 to .89 (see Appendix B).

A demographic form was sent to the participants' parents to gather additional information. The form contained questions about parents' ethnic origin, education, family type, number of children in the family, whether the participant attended

nursery/day care before h/she started school and how frequently they (parents) read storybooks to the participant. (See Appendix B).

4.5.6 Materials

Several picture cards and toy characters were used for the ToM scale. Two cards, one with a picture of a boy and the other with pictures of snacks (carrot and cookie) were used for the Diverse Desire task. A card with a picture of girl with a cat, and another card with pictures of a garden and an attic/store room were used for the Diverse Belief task. A white nondescript box with a mouse inside it and a small teddy bear were used for the Knowledge Access task. A clearly marked sweets box (Smarties for White British and British Pakistani, and Bunties box for Pakistani children) with pens inside it, and a teddy bear were used for the False Belief content task. Two picture cards were used for the hidden emotions task. One card had pictures of happy, sad, and neutral faces on it, and the other card had a picture of several children laughing and pointing at a boy. A variety of picture cards were used for the EF task. For the Day/Night Stroop task, half the cards had pictures of a sun (indicating day), and half the cards had pictures of a moon and stars (indicating night). For the Dimension Change Card Sorting (DCCS) task, 4 cards showed pictures of red stars and 4 showed pictures of yellow stars, and the same number of cards showed red and yellow pentagon shapes. Two wooden pegs were used for the Peg-tapping task. Response record forms were used to record the responses on ToM and EF tasks. Other materials included the forms of MASCS that were given to the teachers and the demographic forms that were sent to the parents of the participants. (See Appendix B for pictures used in tasks and response record form).

4.5.7 Procedure

An ethical approval (E.309) for conducting this study was provided by the Chair of the Humanities, Social and Health Sciences Research Ethics Panel at the University of Bradford. Two schools in Bradford, and two schools in Leeds, who had previously offered to be involved in research with the University of Bradford, agreed to take part in the experiment. All the British Pakistani participants were from the two schools in Bradford. White British participants were selected from one

school in Bradford and one school in Leeds. In British schools the participants were selected from Reception, Year 1 and Year 2 (ages 4- to 7- years). For the Pakistani sample, five private schools in the area of Rawalpindi were contacted. Three of these schools agreed to participate in the research. In Pakistani schools, the data was collected from Nursery, KG and Class One, which corresponded to the first three years in British schools. Before data collection started, all schools were provided opt out consent forms and information sheets, both of which were sent to parents. Parents were asked to return the consent forms to the school. Only those children whose parents gave consent took part in the experiment. Each child was tested individually in a quiet area of the school. It took about 10-15 minutes on average for each child to complete the five ToM and 3 EF tasks. The presentation of the ToM and EF tasks was counterbalanced. Teachers were provided MASCS forms for each child and were requested to return the form to researcher after completion.

The script for the ToM scale was translated in Urdu by two bilinguals from the department of English, Fatima Jinnah Women University Rawalpindi, Pakistan. The Urdu translations were than back translated by two independent bilinguals (who had not seen the English version) from the same department. The researcher than compared the translations and retained the version that most closely matched the English version. The ToM scale was also adapted for Pakistani children. The names of the characters were replaced with familiar Pakistani names, and the sweets box used in the false-belief content task (a Smarties box was used for White British and British Pakistani) was changed with a more familiar sweet box for Pakistani children. Another adaptation was made for the diverse belief task which involved a picture of a room that looks like an attic. The White British and British Pakistani children were familiar with attics, but Pakistani homes usually do not have attics. Pakistani children therefore, were told about a storage room, which they were more accustomed to. The following procedure was used for administering ToM Scale.

1. Diverse Desires (DD): In this task the participant was shown a picture of a child character and two snacks (a cookie and a carrot). H/she was told that

it was snack time and the character wanted a snack to eat. At this point the self-desire question was asked, ‘what would you like to have for snack, a cookie or a carrot?’ The participant was then told that the character liked the opposite snack than the one that the participant mentioned (e.g., if the participant said cookie, h/she was told that the character liked carrot). After that, the participant was asked the test question, “What snack will the character choose to eat? A cookie or a carrot?” The options were presented in random order. To pass this task, participant had to answer the test question giving the opposite to their own desired snack.

2. Diverse Beliefs (DB): In this task, participant was introduced to a female character that had lost her cat. H/she was then shown the pictures of a garden and a room (an attic for White British and British Pakistani participants, and a store room for Pakistani participants), and was asked where did h/she think the cat was hiding (self-belief question). If the participant said in the garden, h/she was told the character thought the cat was hiding in the room (or in garden if the participant said in room). Participant was then asked the test question, “Where do you think the character will look for her cat? In the garden or in the room?” The options were presented in random order. To pass the task participant had to answer the test question with the opposite to their answer to the self-belief question.

3. Knowledge Access (KA): participant was shown a nondescript white box and asked what h/she thought was inside the box. The experimenter then opened the box and showed him/her a small toy mouse inside the box. The toy was then placed back inside the box and the lid was closed. The researcher then reconfirmed the participant’s knowledge by asking “Now you know what is inside the box, don’t you?” After that a toy character (a small teddy bear) was introduced and the participant was told that the toy character had never ever seen inside the box. At this point the participant was asked the first test question, “Does the character know what is inside the box?” The answer to this question is ‘no’ and if the participant answered

this question correctly h/she was then asked the second test questions "Why not?" To pass the task the participant must answer both the test questions correctly. The correct answer to the second question was any response that indicated that the character had not looked inside the box (e.g., because he did not look inside the box, or because the box is closed and he cannot see). Answers such as 'Because I didn't tell him" or "I don't know" were marked as wrong, and no score was given on the task.

4. False Belief (FB): The participant was shown a clearly marked sweets box and asked, 'What do you think is inside this box?' The experimenter then opened the box revealing pens inside. The pens were placed back inside the box and the experimenter presented the closed sweets box to the participant again. The participant was then shown a toy character and asked the test question "what does he (the toy character) think is inside the box?" To pass the test the participant had to answer "sweets" to the test question.

5. Hidden Emotions (HE): In this task the participant was first shown a picture with three faces (happy, neutral, and sad) to check that h/she recognised these emotional expressions. The experimenter then showed a picture of a boy and few other children, and told the story of a boy who was being made fun of by a group of children at school, and all the other children laughed at him. The boy does not like being made fun of and laughed at, but does not want the other children to know how he feels because they would then call him a baby. The participant was then shown the picture of three emotional expressions and was asked the 'actual feeling' question, "How did the character actually feel when everyone laughed? Did he feel happy, sad, or okay?" The participant was then asked the 'apparent feeling' test question, "And how did the character try to look when everyone laughed? Did he try to look happy, sad or okay?" The options were presented in a fixed order to all the participants. To be correct, the participant's answer to the actual feeling question had to be more negative than to the apparent feeling test question (e.g., sad to the actual feeling question, and ok to the apparent feeling

question; or ok to the actual feeling question and happy to apparent feeling question).

The EF tasks used in the current study were the same as used in Experiment 2 detailed in the previous chapter (see chapter 3) and the same procedure was followed for administration of these tasks. However, in the current study there were 12 trials for Peg Tapping and Day/Night tasks as compared to 16 trials in the previous one. Respective class teachers were given MASCS to fill in for each participant. The response rate was 64% for White British participants (51/80), 88% for British Pakistani participants (95/108) and 62% for Pakistani Participants (57/91). The response rate for the demographic form filled in by parents was 44% for White British participants (35/80), 34% for British Pakistani participants (39/108) and 59% for Pakistani Participants (54/91).

4.6 Results

The study was conducted to investigate cultural differences in ToM acquisition in children from three cultural settings. Furthermore, the study aimed to test associations between ToM, EF, and social competence in samples from varied cultural backgrounds. For this purpose 80 White British, 108 British Pakistani and 91 Pakistani children were tested on measures of ToM and EF. Ratings for social competence were obtained from respective teachers, and additional demographic information was gained from parents.

4.6.1 Scoring

ToM tasks were scored as 1 for a correct answer and 0 for an incorrect answer. An aggregate score for the ToM scale was computed by adding scores on the 5 ToM tasks. Therefore, the total score for ToM understanding ranged from 0-5. EF tasks were also scored as 1 for a correct response and 0 for an incorrect response. There were 12 trials for Peg Tapping and Day/Night task, so the total score for each of these tasks was the sum of scores on 12 trials. The DCC tasks had 16 trials, thus the total score for this task was a sum of obtained scores on 16

trials. An aggregate score for EF was computed by adding the total scores of the three tasks, and it ranged from 0-40.

For MASCS a score of 1-4 was given for each statement where 1 is for never (exhibits that behaviour) and 4 is for frequently (exhibits that behaviour). A total score was calculated for pro-social and antisocial dimensions separately. The pro-social subscale included the factors of cooperative skills (5 items) and empathy (3 items) and the aggregate score for this subscale ranged from 8-32. The antisocial subscale comprised of impulsivity (3 items) and disruptiveness (4 items) factors. The composite score for antisocial subscale ranged from 7-28. The higher scores on pro-social subscale indicate more frequent pro-social behaviours, whereas high scores on antisocial subscale indicate high occurrence of antisocial behaviours.

The results of the study are presented under four subsections. Firstly, under the subsection of main demographics, the information related to participants age, gender, number of siblings, parental education and family type is presented. In the second subsection, preliminary analysis of the three variables and their association with age and gender is presented. The third subsection deals with cultural differences. A one way analysis of variance (ANOVA) has been conducted for cultural differences. Finally, the last subsection deals with relationships between the three variables. This section includes results of correlations and a regression analysis.

4.6.2 Main Demographics

This section presents demographic variables such as age gender and number of participants in different school years for three cultural groups. It also includes information about the additional data collected from parents.

Table 20. Age and gender of Participants from three cultural groups

	Age (in years)			Gender	
	Mean	(S.D)	Range	F	M
White British (N=80)	5.18	(.90)	4.02-7.00	43 (54%)	37 (46%)
British Pakistani (N=108)	5.07	(.88)	4.01-7.00	55 (51%)	53 (49%)
Pakistani (N=91)	5.14	(.77)	4.00-6.11	53 (58%)	38 (42%)

Table 20 shows the Mean, SD, and age range for the participants from the three different cultural groups. The percentage of male and female participants is also indicated.

Table 21. Number of participants in each school year for three cultural groups

	4-5 years	5-6 years	6-7 years
White British (N=80)	28 (35%)	25 31	27 (34%)
British Pakistani (N=108)	39 (36%)	39 (36%)	30 (28%)
Pakistani (N=91)	26 (29%)	32 (35%)	33 (36%)

Table 21 shows the number of participants in different age groups from the three samples. The approximate ages of participants in reception were 4-5 years. In Year 1 the age range was approximately from 5-6 years, and in Year 2 of school the ages ranged from 6-7 years.

Additional information was collected through a demographic form that was sent to parents via teachers. The return rate of this demographic form was quite low and therefore the data is not available for all the participants. The return rate for the demographic form filled in by parents was 44% for White British participants (35/80), 34% for British Pakistani participants (39/108) and 59% for Pakistani Participants (54/91). This additional demographic data is presented in Tables 22-28.

Table 22. Number of Siblings for participants from three cultural groups

	Total Number of siblings (percentage)					Older siblings (percentage)				Younger siblings (percentage)		
	0	1	2	3	4-5	0	1	2	3-4	0	1	2-3
White British (N=35)	2 (6)	20 (57)	9 (26)	4 (11)	-	17 (49)	12 (34)	6 (17)	-	16 (46)	16 (46)	3 (8)
British Pakistani (N=39)	3 (8)	15 (38)	10 (26)	6 (15)	5 (13)	10 (26)	19 (48)	5 (13)	5 (13)	17 (43)	16 (41)	6 (16)
Pakistani (N=54)	2 (4)	22 (41)	20 (37)	7 (13)	3 (5)	26 (48)	12 (22)	9 (17)	7 (13)	22 (41)	23 (42)	9 (17)

Table 22 indicates the total number of siblings, number of older siblings, and number of younger siblings for participants from three cultural groups. Most participants from each cultural group had one sibling. The maximum number of siblings reported for White British participants was three, whereas for British Pakistani and Pakistani participants it was five. The majority of the participants in each group had one older sibling. In the White British sample, 49% participants had no older sibling, 34% had one, and 17% had two older siblings. In the British Pakistani sample, 48% had one older sibling, whereas 26% had two or more older siblings. In the Pakistani sample, 48% had no older sibling, 22% had one, and 30% had two or more older siblings. About 41-46% of the sample in all groups had no younger siblings, and about the same percentage of participants had one younger sibling.

Table 23. Percentage of participants attending Nursery/Day-care

	Yes	No
White British (N=35)	34 (97%)	1 (3%)
British Pakistani (N=39)	36 (92%)	3 (8%)
Pakistani (N=54)	6 (11%)	48 (89%)

Table 23 indicates the number of participants that attended the nursery/day-care before joining the school. The majority of White British and British Pakistani participants had attended nursery/day-care, whereas most of the Pakistani participants had not.

Table 24. Mother Qualification

	None	Grade 5 or less	GCSE/ SSC	A level/ HSSC	Bachelors	Post graduate	Other/not known
White British (N=35)	-	-	10 (29%)	5 (14%)	9 (26%)	9 (26%)	2 (5%)
British Pakistani (N=31)	3 (10%)	5 (16%)	10 (32%)	7 (23%)	3 (10%)	2 (6%)	1 (3%)
Pakistani (N=54)	-	1 (2%)	2 (4%)	11 (20%)	22 (41%)	18 (33%)	-

SSC= Secondary school certificate, HSSC= Higher secondary school certificate

Table 24 shows the level of education of the participants' mothers. None of the White British participants' mothers had an educational level less than GCSE (29%). Approximately 52% had a bachelors or a post graduate degree. On contrary about 16% of British Pakistani participants' mothers had an educational level of grade 5 or less and 10% reported having no formal education at all. Approximately 32% British Pakistani mothers reported having a GCSE/SSC and 23% reported having an A level/HSSC qualification. About 41% of Pakistani participants' mothers had a Bachelors (14 years of education) and 33% had a post graduate degree.

Table 25. Father Qualification

	None	Grade 5 or less	GCSE/ SSC	A level/ HSSC	Bachelors	Post graduate	Other
White British (N=35)	-	-	11 (31%)	1 (3%)	11 (31%)	9 (26%)	2 (6%)
British Pakistani (N=32)	4 (12.5%)	1 (3%)	13 (41%)	6 (19%)	4 (12.5%)	3 (9%)	1 (3%)
Pakistani (N=54)	-	1 (2%)	4 (7%)	8 (15%)	16 (30%)	25 (46%)	-

SSC= Secondary school certificate, HSSC= Higher secondary school certificate

Table 25 shows the level of education of the participants' fathers. None of the White British participants' fathers had an educational level less than GCSE (31%). Approximately 31% of White British participants' fathers reported having a Bachelors and 26% reported having a postgraduate degree. About 12.5% of British Pakistani participants' fathers reported having no formal education at all, whereas 41% reported having a GCSE/SSC and 19% reported having an A level/HSSC qualification. About 30% of Pakistani participants' fathers had a Bachelors (14 years of education) and 46% had a post graduate degree.

Table 26. Percentages of participants belonging to different family systems

	Nuclear	Joint	Extended	Single-parent
White British (N=35)	17 (48.5%)	0	17 (48.5%)	1 (3%)
British Pakistani (N=39)	18 (46%)	20 (51%)	1 (3%)	0
Pakistani (N=54)	7 (13%)	32 (59%)	15 (28%)	0

Table 26 indicates the type of family system that the participants belonged to. Nuclear family was defined as only parents and their children living together. Whereas the joint family referred to a setting where other blood relations such as grandparents, aunts and uncles were also living under one roof. Extended family was considered where the family unit is nuclear (only parents and children living together) but they live in close proximity and are in frequent contact with other relatives such as grandparents or uncles/aunts and cousins. Frequent contact in this regard is regular visits to the relatives (at least once every week). A single-parent family referred to a nuclear family with only one parent. About half the White British participants were reported to be living in nuclear family systems and the other half reported extended family system. About 46% of the British Pakistani participants were reported living in nuclear and 51% were reported living in a joint family systems. More than half (59%) Pakistani participants were reported to be living in joint family systems whereas the percentage of participants living in extended and nuclear family systems was 28% and 13% respectively.

Table 27. Birth heritage of parents of British Pakistani Children

	Both parents born in other country (Pakistan) and migrated to Britain	One parent born in other country (Pakistan) and migrated to Britain	Both parents born in Britain but at least one of their parents born in Pakistan
British Pakistani (N=39)	15 (39%)	20 (51%)	4 (10%)

Table 27 shows that 39% British Pakistani participants had parents who were both born in Pakistan and later migrated to UK, and 51% participants had at least one parent who was born in Pakistan. Only 10% participants had parents who were both born in the UK.

Table 28. Frequency of parental storybook reading

	Never	Sometimes	Often	Frequently
White British (N=35)	0	3 (8.5%)	3 (8.5%)	29 (83%)
British Pakistani (N=39)	2 (5%)	17 (43.5%)	12 (31%)	8 (20.5%)
Pakistani (N=54)	2 (4%)	29 (54%)	17 (31%)	6 (11%)

Parents were asked to indicate how often they engage in a storybook reading activity with their child (see Table 28). The majority of White British parents indicated that they frequently read books to their child, whereas most of the British Pakistani and Pakistani parents stated that they engage in such an activity sometimes, but not often.

4.6.3 Preliminary Analysis

This section includes the preliminary analysis of the variables (ToM, EF and social competence) separately for the three cultural groups. In addition the association of main variables with demographic characteristics such as age and gender is also explored in this section.

Table 29. Total ToM score for the three cultural groups

	0	1	2	3	4	5
White British (N=80)	-	2 (2.5%)	13 (16%)	18 (22.5%)	28 (35%)	19 (24%)
British Pakistani (N=108)	7 (6.5%)	11 (10%)	34 (31.5%)	16 (15%)	29 (27%)	11 (10%)
Pakistani (N=91)	4 (4%)	9 (10%)	18 (20%)	36 (39%)	17 (19%)	7 (8%)
Total (N=279)	11 (4%)	22 (8%)	65 (23.25%)	70 (25%)	74 (26.5%)	37 (13.25%)

Table 29 provides information about the number of participants passing ToM tasks in different cultural groups. About 35% of White British participants passed four ToM tasks and 24% passed five ToM tasks. On the other hand about 7% of British Pakistani and about 4% of Pakistani participants failed to pass any of the ToM tasks. Majority of the British Pakistani participants (31.5%) passed two tasks whereas about 39% of Pakistani participants got correct answers to three ToM tasks.

Table 30. Mean and SD on individual ToM tasks and Total score

	DD	DB	KA	FB	HE	TOTAL ToM
White British (N=80)	.94 (.24)	.69 (.46)	.81 (.39)	.71 (.45)	.46 (.50)	3.61 (1.09)
British Pakistani (N=108)	.83 (.37)	.64 (.48)	.58 (.49)	.32 (.47)	.38 (.48)	2.76 (1.39)
Pakistani (N=91)	.78 (.41)	.60 (.49)	.65 (.48)	.31 (.46)	.45 (.50)	2.79 (1.22)
Total (N=279)	.85 (.36)	.64 (.48)	.67 (.47)	.43 (.49)	.43 (.49)	3.01 (1.31)

SD in parenthesis, DD=diverse desire, DB=Diverse belief, KA=knowledge access, FB=false belief, HE=hidden emotion

Table 30 shows mean scores and SD of individual ToM tasks as well as of the total ToM score. For the White British group the mean score for diverse desire was highest followed by knowledge access, false belief, diverse belief and hidden emotion respectively. The mean scores for British Pakistani group were also highest for diverse desire task followed by diverse belief, knowledge access, hidden emotion and false belief respectively. For the Pakistani group the mean score on diverse desire was followed by knowledge access, diverse belief, hidden emotion and false belief respectively.

Table 31. Mean and Standard deviation on EF tasks (total score)

	Day/night Stroop	Peg-tapping	DCCS	Total EF
White British (N=80)	9.31 (4.14)	10.71 (2.79)	15.33 (2.01)	35.35 (6.91)
British Pakistani (N=108)	7.35 (4.55)	8.98 (3.75)	14.36 (2.81)	30.61 (8.78)
Pakistani (N=91)	7.91 (4.25)	9.58 (3.55)	14.07 (3.41)	31.56 (8.54)
Total (N=279)	8.10 (4.40)	9.68 (3.49)	14.54 (2.86)	32.38 (8.23)

SD in parenthesis, DCCS= Dimension Change Card Sorting

Table 31 shows mean scores and SD of individual EF tasks as well as of the aggregate score for EF. The mean score for Dimension Change Card Sorting (DCCS) task was highest for all the groups followed by peg-tapping and Day/Night Stroop tasks respectively. On the total EF the White British group had the highest mean score followed by Pakistani and British Pakistani participants respectively.

Table 32. Mean and Standard deviation on subscales of MASCS

	N	Pro-social	Anti-social
White British	52	27.21	10.94
		(4.19)	(4.33)
British Pakistani	95	22.19	11.41
		(3.47)	(3.35)
Pakistani	62	24.27	12.56
		(3.93)	(3.95)
Total	209	24.06	11.64
		(4.29)	(3.83)

SD in parenthesis

Mean scores and SD of subscales of MASCS is presented in table 32. On pro-social subscale the White British participants had highest mean score followed by Pakistani and British Pakistani participants. On the other hand on anti-social subscale the highest mean score was of British Pakistani participants followed by Pakistani and white British participants.

Table 33. ANOVA for Age differences in ToM and EF

	4-5-year-olds N=93	5-6-year-olds N=96	6-7-year-olds N=90	F	P
	M	M	M		
ToM	2.25 (1.30)	3.16 (1.07)	3.66 (1.14)	33.63	.000
EF	26.46 (9.08)	33.72 (6.01)	37.13 (5.12)	48.40	.000

SD in parenthesis

To investigate whether there was a significant difference in performance of age groups on tasks of ToM and EF, a one-way between subjects analysis of variance (ANOVA) was conducted (see Table 33). There was a significant effect of age on performance on ToM for the three age groups: F (2, 276) = 33.63, p=.000. Post-hoc comparisons using the Bonferroni test indicated that the mean score for 4-5-year-olds (M=2.25, SD=1.30) was significantly lower than that of 5-6-year-olds (M=3.16, SD=1.07, p<0.001), and 6-7-year-olds (M=3.66, SD=1.14, p<0.001). This indicated that the younger participants (4-5 year olds) performed worse than both the older groups. Furthermore, the 6-7-year-olds performed significantly better than participants from 5-6-year-olds (p = 0.013).

The assumption of homogeneity of variance was violated for EF analysis; therefore, the Welch F-ratio is reported. There was a significant effect of age on performance on EF tasks: F (2, 177) = 48.40, p<0.001. Post-hoc comparisons using the Bonferroni test indicated that the performance of the 4-5-year-olds (M=26.46, SD=9.08) was significantly lower than the performance of 5-6-year-olds (M=33.72, SD=6.01, p<0.001), as well as 6-7-year-olds (M=37.13, SD=5.12, p<0.001). There was also a significant difference in the performance of 5-6-year-olds and 6-7-year-olds (p=0.003).

Table 34. ANOVA for Age differences on subscales of MASCS

	4-5-year-olds N=93	5-6-year-olds N=96	6-7-year-olds N=90	F	P
	M	M	M		
Pro-social	22.70 (3.71)	24.01 (3.80)	25.55 (4.92)	7.24	.001
Anti-social	12.03 (3.91)	12.05 (3.68)	10.74 (3.82)	2.62	.075

SD in parenthesis

A one-way between groups analysis of variance (ANOVA) was conducted to compare the effect of age on pro-social and antisocial subscales of MASCS for 4-5 year olds, 5-6 year olds and 6-7 year olds (see Table 34). The assumption of homogeneity of variance was violated for the pro-social scale; therefore, the Welch F-ratio is reported for this scale. There was a significant effect of age on pro-social subscale of MASCS at the $p<0.01$ level for the three age groups: F (2, 132) = 7.24, $p<0.001$]. Post-hoc comparisons using the Bonferroni test indicated that that the mean score for 4-5-year-olds (M = 22.70, SD = 3.71) was significantly different than the 6-7-year-olds (M = 25.55, SD = 4.92; p<0.001). However, there was no significant difference between performance of 4-5-year-olds and 5-6-year-olds (p=0.17), or 5-6-year-olds and 6-7-year-olds (p=0.090). There was no significant effect of age on the ratings of the three age groups on anti-social subscale.

Table 35. Mean, SD and value of t-test for gender differences on ToM, EF, and social competence

	N		Male		Female		*t*	*df*	*p*
	Male	Female	Mean		Mean				
ToM	127	151	2.82	(1.36)	3.18	(1.24)	2.29	227	.023
EF	127	151	32.00	(8.21)	32.71	(8.26)	.72	276	.472
Pro-social	99	104	23.79	(4.34)	24.32	(4.24)	.899	207	.370
Anti-social	99	104	12.09	(3.79)	11.20	(3.83)	-1.68	207	.094

SD in parenthesis

An Independent sample t-test was conducted to compare the scores of males and females on ToM scale, EF tasks and subscales of MASCS. The results of t-test (see Table 36) indicate that the mean score for females (M=3.18, SD=1.36) was significantly higher than the mean score of males (M=2.82, SD=1.36; t=2.29, p=0.023). This suggested that female participants exhibited a better understanding of the mental states of protagonists in ToM tasks than male participants. There were no significant gender differences on EF tasks or on the subscales of MASCS.

4.6.4 Main Analysis for Cultural differences

This section includes the results of analysis for cultural variation in ToM, EF and social competence.

Table 36. ANOVA for cultural differences in ToM and EF

	White British N=80	British Pakistani N=108	Pakistani N=90	F	P
	M	M	M		
ToM	3.61 (1.09)	2.76 (1.39)	2.79 (1.22)	14.77	.000
EF	35.35 (6.91)	30.61 (8.78)	31.88 (7.99)	9.34	.000

SD in parenthesis

A one-way between subjects analysis of variance (ANOVA) was conducted to explore the effect of culture on development of ToM ability in White British, British Pakistani, and Pakistani groups (see table 36). The assumption of homogeneity of variance was violated; therefore, the Welch F-ratio is reported. There was a statistically significant difference at the p <0.001 level in ToM ability for the three cultural groups: F (2, 182.5) = 14.77, p=.000. Due to unequal sample sizes in the cultural groups the Gabriel test was used for Post hoc comparisons. The Gabriel test indicated that the mean score for White British group (M=3.70, SD=1.02) was higher than the British Pakistani (M=2.81, SD= 1.39; p<0.001) and the Pakistani group (M=2.91, SD=1.17; p<0.001). There was no significant difference between British Pakistani and Pakistani groups (p=0.997). This indicated that the White British children out-performed both Pakistani and British Pakistani children, whereas there was no significant difference between the performance of Pakistani and British Pakistani children.

The assumption of homogeneity of variance was violated for EF analysis too; therefore, the Welch F-ratio is reported. There was a statistically significant difference at the p <0.001 level in EF ability for the three cultural groups: F (2, 181.7) = 9.34, p=.000. Post-hoc comparisons using the Gabriel test indicated that the mean score for White British group (M=35.35, SD=6.91) was significantly higher than the British Pakistani (M=30.61, SD= 8.78; p<0.001) and the Pakistani group (M=31.8, SD=7.99; p=0.008). There was no significant difference between British Pakistani and Pakistani groups (p=0.801).

Table 37. ANOVA for cultural differences in ToM and EF in 4-5-year-olds

	White British N=28	British Pakistani N=39	Pakistani N=26	F	P
	M	M	M		
ToM	3.18 (1.18)	1.82 (1.18)	1.88 (1.10)	14.77	.000
EF	31.89 (8.43)	24.00 (8.84)	24.30 (7.78)	9.34	.000

SD in parenthesis

A one-way between subjects analysis of variance (ANOVA) was conducted to compare the effect of culture on ToM understanding of 4-5-year-olds from three cultural groups. Table 37 indicates that there was a significant effect of culture on ToM score at the p<.001 level for the three groups: F (2, 90) = 14.77, p<0.001. Due to unequal sample sizes in the cultural groups the Gabriel test was used for Post hoc comparisons. The Gabriel test indicated that the mean score for White British group (M = 3.18, SD = 1.18) was significantly higher than the British Pakistani (M = 1.82, SD = 1.18; p<0.001) and the Pakistani groups (M = 1.88, SD = 1.10; p<0.001). However, the British Pakistani group did not significantly differ from the Pakistani group on ToM scores (p=.995).

A one-way between subjects analysis of variance (ANOVA) to compare the effect of culture on EF skills in 4-5-year-olds from three cultural groups, revealed a significant effect of culture on EF scores at the $p<.01$ level for the three groups: $F(2, 90) = 9.34$, $p<0.001$ (see Table 50). Post hoc comparisons using the Gabriel test indicated that the mean score for White British group ($M = 31.89$, $SD = 8.84$) was significantly higher than the British Pakistani ($M = 24.00$, $SD = 8.84$; $p=0.001$) and the Pakistani groups ($M = 24.30$, $SD = 7.78$; $p=0.004$). However, the British Pakistani group did not significantly differ from the Pakistani group on EF scores ($p=0.995$).

Table 38. ANOVA for cultural differences in ToM and EF in 5-6-year-olds

	White British N=25	British Pakistani N=39	Pakistani N=32	F	P
	M	M	M		
ToM	3.52 (1.00)	2.97 (1.18)	2.77 (0.96)	4.07	.021
EF	36.44 (5.29)	32.35 (4.67)	33.28 (6.92)	3.86	.024

SD in parenthesis

A one-way between subjects analysis of variance (ANOVA) was conducted to compare the effect of culture on ToM understanding and EF scores of 5-6-year-olds from three cultural groups. There was a significant effect of culture on ToM score at the $p<0.05$ level for the three cultural groups: $F (2, 93) = 4.07$, $p = 0.021$ (see Table 38). Due to unequal sample sizes in the cultural groups the Gabriel test was used for Post hoc comparisons. The Gabriel test indicated that the mean score for White British group ($M = 3.52$, $SD = 1.00$) was significantly higher than the Pakistani group ($M = 2.77$, $SD = 0.96$, p=0.020). However, the British Pakistani group ($M = 2.97$, $SD = 1.18$) did not significantly differ from the White British and Pakistani groups on ToM scores ($p=.356$).

In addition, the effect of culture was also significant for EF at the p<0.05 level for the three groups: *F* (2, 93) = 3.86, *p* = 0.024]. The post-hoc analysis using Gabriel test indicated that the mean score for White British group (*M* = 36.44, *SD* = 5.29) was significantly higher than the British Pakistani group (*M* = 32.35, *SD* =6.92, *p*=0.023). However, the Pakistani group (*M* = 33.28, *SD* =4.67) did not significantly differ from the White British or British Pakistani group (*p*=.137).

Table 39. ANOVA for cultural differences in ToM and EF in 6-7-year-olds

	White British N=27	British Pakistani N=30	Pakistani N=33	F	P
	M	M	M		
ToM	4.15 (.86)	3.70 (1.14)	3.21 (1.19)	5.52	.006
EF	37.92 (4.96)	36.93 (3.85)	35.60 (8.62)	1.02	.362

SD in parenthesis

A one-way between subjects analysis of variance (ANOVA) was conducted to compare the effect of culture on ToM understanding and EF scores of 6-7-year-olds from three cultural groups. There was a significant effect of culture on ToM score at the *p*<0.01 level for the three groups: *F* (2, 87) = 5.52, *p*<0.01 (see Table 39). Due to unequal sample sizes in the cultural groups the Gabriel test was used for Post hoc comparisons. The Gabriel test indicated that the mean score for White British group (*M* = 4.15, *SD* = .86) was significantly higher than the Pakistani group (*M* = 3.21, *SD* = 1.19; *p*=0.004). However, the British Pakistani group (*M* = 3.70, *SD* =1.14) did not significantly differ from the White British (*p*=0.32) and Pakistani groups (*p*= 0.218) on ToM scores. The results suggest no significant effect of culture on EF scores in 6-7-year-olds: *F* (2, 87) = 1.02, *p* = 0.36].

Table 40. ANOVA for cultural differences on subscales of MASCS

	White British N=51	British Pakistani N=95	Pakistani N=57	F	P
	M	M	M		
Pro-social Scale	27.21 (4.19)	22.19 (3.47)	24.27 (3.93)	29.42	.000
Anti-social Scale	10.94 (4.33)	11.41 (3.35)	12.56 (3.95)	2.57	.081

SD in parenthesis

A one-way between subjects analysis of variance (ANOVA) was conducted to compare the effect of culture on pro-social and anti-social subscales of MASCS for the three cultural groups. The assumption of homogeneity of variance was violated for the anti-social subscale; therefore, the Welch F-ratio is reported for this subscale. The results suggested a significant effect of culture on pro-social subscale of MASCS at the p <0.001 level for the three cultural groups: F (2, 206) = 29.42, p<0.001] (see Table 40). The Gabriel test was used for post-hoc analysis due to unequal sizes of the sample in different groups. Post-hoc comparisons using the Gabriel test indicated that the mean score of white British group (M=27.21, SD= 4.19) was significantly higher than the British Pakistani (M=22.19, SD= 3.47; p<0.001) and Pakistani (M=24.27, SD=3.93; p<0.001) groups. The mean score of British Pakistani children was also significantly different than that of Pakistani children (p=0.003). There were no significant effects of culture on the ratings of the three groups on anti-social subscale: F (2, 206) = 2.57, p=0.081] (see Table 53). Taken together, these results suggested that white British participants were rated highest on pro-social behaviours, followed by Pakistani and British Pakistani participants respectively.

Table 41. Partial Correlation between ToM, SC and EF after controlling for age (N=279)

	EF (N=279)	Pro-social (N=)	Anti-social (N=)
ToM	.400***	.245***	-.160*
EF	-	.189**	-.047

*Correlation is significant at p<0.05, **Correlation is significant at p<0.01, ***Correlation is significant at p<0.001

Partial correlation was conducted to find out the relationship between ToM, EF and subscales of MASCS after controlling for the effect of age (see table 41). The scores on ToM showed a significant positive correlation with EF (r=400, p <0.001) and pro-social behavior (r=.245, p <0.001). EF was also positively associated with pro-social subscale of MASCS (r=.189, p=.006).

4.6.5 Additional Analysis

There appeared to be an interesting trend regarding book reading in the three cultural groups that emerged from the demographic form that was sent to the parents. Additional analysis was conducted to see if there were any significant differences in book reading practices of the three cultural groups and if any links could be established in book reading and the main variables of the study.

Table 42. ANOVA for differences in book reading frequency in White British, British Pakistani and Pakistani groups

	White British (N=35)	British Pakistani (N=39)	Pakistani (N=53)	F	P
	M	M	M		
Parental book reading	2.74 (.61)	1.67 (.86)	1.51 (.75)	40.50	.000

A one-way between groups analysis of variance (ANOVA) was conducted to explore the impact of culture on parental storybook reading to children. The assumption of homogeneity of variance was violated; therefore, the Welch F-ratio is reported. There was a statistically significant difference at the p <0.001 level in ToM ability for the three cultural groups: F (2, 78) = 40.50, p<0.001 (see Table 42). Post-hoc comparisons using the Bonferroni test indicated that the mean score for White British group (M=2.74, SD=.61) was significantly higher from the British Pakistani (M=1.67, SD=.86; p<0.001) and the Pakistani group (M=1.51, SD=.75; p p<0.001). There was no significant difference between British Pakistani and Pakistani groups (p=.882).

Table 43. Pearson Correlation between parental book reading and ToM, SC and EF

		ToM (N=128)	EF (N=128)	Pro-social (N=112)	Antisocial (N=112)
Parental Reading	Book	.259**	.249**	.396***	-.086

** Correlation is significant at p<0.01, ***Correlation is significant at p<0.001

Table 44 shows that there was a statistically significant relationship of parental book reading with ToM (*r*=.259, *p*=0.003). Likewise, parental book reading also had a significantly positive correlation with EF (*r*=.249, *p*=0.005) and pro-social behaviours (*r*=.259, *p*<0.001).

4.6.6 Hierarchical Multiple Regression

A hierarchical multiple regression was carried out to assess the significant predictors of ToM. Age and ethnic group were entered in the first block of the regression model. This was done keeping in view the suggestion that socio-demographic variables should be entered first in regression model (Williams et al. 2007). In the second block EF was entered based on previous research evidence that supports the association of Ef and ToM (Devine and Hughes, 2014) and in the third block the score of pro-social subscale of MASCS was entered.

The analysis revealed that there was independence of residuals, as indicated by a Durbin-Watson statistic of 1.96 (Field 2009). The analysis also showed that all the Tolerance values were greater than 0.1 (lowest was 0.72), and VIF values were less than 10 (highest was 1.41) indicating that there was no issue of collinearity among the variables (see Appendix B).

Table 44. Hierarchal multiple regression analysis of ToM (N=209)

Variables	*R*	R^2	R^2 *Change*	*B*	*SE*	*β*	*t*	*Sig(p)*
Step One	**0.49**	**0.24*** **						**<0.001**
Age				0.69	0.09	0.44	7.27	<0.001
Ethnic Group				0.37	0.10	0.20	3.44	0.001
Step Two	**0.59**	**0.35*** **	**0.11*** **					**<0.001**
Age				0.38	0.10	0.24	3.73	<0.001
Ethnic Group				0.28	0.10	0.16	2.80	0.005
EF				0.05	0.01	0.38	5.88	<0.001
Step Three	**0.60**	**0.36*** **	**0.01***					**<0.001**
Age				0.35	0.10	0.22	3.43	0.001
Ethnic Group				0.23	0.10	0.13	2.30	0.022
EF				0.05	0.01	0.36	5.50	<0.001
Pro-social skill				0.04	0.01	0.13	2.23	0.026

EF=executive functions
R^2 = amount of variance explained by IVs ; R^2 Change = additional variance in DV ; B = Unstandardized coefficient ; β = Standardized coefficient; SE= Standard Error t = estimated coefficient

Table 44 presents the results of Hierarchical Multiple Regression analysis to determine significant predictors of ToM. In the first step of analysis sociodemographic variables i.e. age and ethnic group were entered as predictive variables. This model was statistically significant ($F (2, 206) = 32.87$; $p < 0.001$) and accounted for 24 % of the variance in ToM. In the first model both age ($\beta = 0.44$, $p<0.001$) and ethnic group ($\beta = 0.20$, $p=0.001$) were identified as significant predictors of ToM. In the second step EF was entered as a predictive variable and the total variance explained by the model as a whole was 35% ($F (3, 205) =37.04$; $p<0.001$). The introduction of EF explained additional 11% of variance in ToM, after controlling for age and ethnic group (R^2 Change = .011; $F (1, 205) = 34.64$; $p<0.001$). In step 3 of the model, pro-social skills were entered and the total variance explained by the model as a whole was 36% ($F (4, 204) = 29.58$; $p<0.001$). The introduction of pro-social skills explained additional 1% of variance in ToM, after controlling for age, ethnic group and EF, (R^2 Change = .01; $F (1, 204) = 5.01$; $p = 0.026$).

A hierarchical multiple regression analysis was carried out to assess the significant predictors of social competence measured by pro-social subscale of MASCS. Sociodemographic variables such as age, gender and ethnic group were entered in the first block of the regression model. In the second and third block ToM and EF were entered respectively.

The analysis revealed that there was independence of residuals, as indicated by a Durbin-Watson statistic of 1.76 (Field 2009). The analysis also showed that all the Tolerance values were greater than 0.1 (lowest was 0.62), and VIF values were less than 10 (highest was 1.61) indicating that there was no issue of collinearity among the variables (see Appendix B).

Table 45. Hierarchal multiple regression analysis of social competence (N=209)

Variables	*R*	R^2	R^2 *Change*	*B*	*SE*	*β*	*t*	*Sig(p)*
Step One	**0.33**	**0.11*** **						**<0.001**
Age				1.19	0.33	0.23	3.53	0.001
Ethnic Group				1.32	0.38	0.22	3.45	0.001
Gender				-0.58	0.56	-0.06	-1.03	0.302
Step Two	**0.38**	**0.14*** **	**0.03****					**<0.001**
Age				0.71	0.37	0.14	1.93	0.055
Ethnic Group				1.05	0.38	0.18	2.70	0.007
Gender				-0.30	0.56	-0.03	-.54	0.589
ToM				0.68	0.24	0.21	2.81	0.005
Step Three	**0.39**	**0.15*** **	**0.008**					**<0.001**
Age				0.52	0.39	0.10	1.31	0.189
Ethnic Group				1.02	0.38	0.17	2.63	0.009
Gender				-0.32	0.56	-0.03	-0.58	0.561
ToM				0.55	0.26	0.17	2.10	0.037
EF				0.05	0.04	0.11	1.34	0.180

EF=executive functions

R^2 = amount of variance explained by IVs ; R^2 Change = additional variance in DV ; B = Unstandardized coefficient ; β = Standardized coefficient; SE= Standard Error t = estimated coefficient

Table 45 presents hierarchical multiple regression analysis of social competence. Sociodemographic variables such as age, gender and ethnic group were entered first in the regression model. This model was statistically significant F (3, 205) = 8.62; p <0.001 and explained 11.0% of variance in social competence. In the first model age (β = -0.23, p=0.001) and ethnic group (β = 0.22, p=0.001) were identified as significant predictors of social competence.

In the second step ToM was entered and the total variance explained by the model as a whole was 14.0 % (F (3, 205) = 8.62; p <0.001). The introduction of ToM explained additional 3% of variance in social competence, after controlling for age and ethnic group (R^2 Change = .011; F (4, 204) = 8.67; p<0.001). ToM (β = 0.21, p=0.005) was identified as a significant predictor, however ethnic group (β = 0.18, p=0.007) also remained significant predictor of social competence.

In the final step EF was entered as a predictor variable which further increased the variance significantly up to 15.0 % (F (5, 203) = 7.32; p <0.001). However EF did not contribute significantly to increase in the amount social competence. In the final model, ethnic group (β = 0.55, p<0.001) was identified as most significant predictor, whereas ethnic group (β = -0.17, p=0.009), and ToM (β = -0.17, p=0.037) still remained significant predictors of social competence.

4.7 Discussion

The current research was carried out to investigate cultural differences in ToM understanding and the universality of associations between ToM, EF, and social competence. To explore the cultural variations, data was collected from children between the ages of 4-7 years, living in three diverse cultural settings. Two of these cultural groups, White British and Pakistani children, were living in their native cultures and represented individualist and collectivist cultures respectively. Whereas the third group (i.e., British Pakistani children) was exposed to elements of both Pakistani (at home) and British culture (outside the home and at schools). Participants in all groups were tested on five ToM tasks and three EF

tasks. Ratings for social competence were provided by their respective teachers on MASCS. The return rate of MASCS by teachers was 62% for Pakistani participants, 64% for White British, and 88% for British Pakistani participants. Demographic forms were filled in by parents to provide additional information (such as number of siblings, family system etc.), however data was not available for all the participants. The return rate of demographic forms was 36% for White British, 43% for British Pakistani, and 59% for Pakistani participants. The main findings of the study are discussed below.

4.7.1 Findings of Preliminary Analysis

The data from current study replicated the common findings of a positive relationship between age and performance on ToM as well as EF tasks. The scores on ToM tasks showed a significant correlation with age indicating that mental state understanding increased with the age of the children. There is substantial evidence to support this link in literature (Hughes 1998; Carlson and Moses 2001; Wellman et al. 2001; Carlson et al. 2004; Wellman and Liu 2004; Newton and Jenvey 2011). Furthermore, there were significant differences in the performance of three age groups on total score of ToM scale. The performance of 6-7 year olds was significantly higher than that of 5-6 and 4-5 year olds. Likewise, the 5-6 year olds performed significantly higher than the 4-5 year olds. Moreover, these differences were fairly consistent across all cultural groups.

The performance on EF tasks also had a significant positive relation with age, indicating that the older children exhibited better executive functioning abilities than the younger ones. These findings are also consistent with existing literature that suggests an increased improvement in EF during childhood (Carlson and Moses 2001; Pellicano 2007). A similar trend was also observed for the pro-social subscale of MASCS. A significant positive correlation existed between age and teacher's ratings of pro-social behaviours. This indicated that older children exhibited more co-operative and empathic behaviours than the younger ones. Existing literature on social competence also supports the views that as the children grow older their tendency to exhibit pro-social behaviours increases (Svetlova et al. 2011; Farrant et al. 2012). However, there was no significant

relationship between age and the anti-social subscale of MASCS. The findings suggested a similar developmental trend in ToM, EF and social competence during 5-8 years of age. Older children showed an increased understanding of mental states, their executive functioning abilities were better than younger children, and at the same time they started exhibiting more pro-social behaviours.

The findings of the current study revealed a significant difference in the scores of female and male participants on ToM tasks. These results suggested that females exhibit a better understanding of mental states than their male counterparts. These results are consistent with the findings of Calero et al. (2013), who tested 6-8 year olds on the same ToM scale as used in the present study and found that girls had a significant advantage over boys in understanding of all mental states. Likewise, Devine and Hughes (2013) reported that females outperformed males on a latent ToM task in a sample of 8-13 year olds. Similar findings were also reported by Bosacki and Astington (1999), where 9-11 year old girls performed better on ToM tasks. However, when separate independent-samples t-test were performed to investigate gender differences in three age groups the difference was only significant for 6-7 year olds. The lack of gender differences in younger children in the present study, can be explained by the gender intensification hypothesis (Hill and Lynch 1983), which postulates that gender differences escalate with age due to increased pressure to confirm to expected gender roles. This argument is also validated by studies that tested children between 3-6 years of age and found no gender differences on ToM tasks (Raza and Blair 2009; Hughes et al. 2011).

Although, there was a significant gender difference on ToM performance for the overall sample, this difference was not consistent across cultures. When the three cultural groups were tested separately for gender differences, the difference in the scores of females and males was only significant for the British Pakistani group. There were no significant gender differences in the performance of White British and Pakistani samples. Similar findings have also been previously reported by Caputi et al. (2012) who found no gender differences in a longitudinal study that tested children at 5, 6, and 7 years. Likewise, Wang et al (2016) tested 10 to 16

year olds from UK and Hong Kong and found no gender differences in performance on ToM or EF tasks. The inconsistency of gender differences in mental understanding could possibly be attributed to the tasks used for measuring ToM. Most of the studies investigating ToM use FB as a standard measure of ToM and it appears that the effect of gender on FB understanding is minimal. There is a possibility that males and females differ only in their understanding of certain mental states. The investigation of gender differences on individual ToM tasks for the British Pakistani sample revealed that the difference was significant on only two ToM tasks; diverse belief and hidden emotion. It can be argued that early experiences of male and female children could contribute to the understanding of certain mental states. For example, regarding emotions, it has been reported that mothers, as well as older siblings, talk more about emotions and feelings to girls than boys in toddlerhood (Dunn et al. 1987; Cervantes and Callanan 1998). It has also been documented that early references to mental state talk are linked to later ToM understanding (Brown et al. 1996; Ensor and Hughes 2008; Ensor et al. 2014). In other words, it seems plausible that since girls experience more references to emotions in their conversations with the family at an early age, they tend to perform better than boys on the hidden emotion task. There is a possibility that girls and boys differ more in understanding of affective mental states rather than cognitive mental states. However, the current findings suggest that these differences appear to be moderate and not very consistent.

4.7.2 Cultural Variations in ToM

Regarding cultural variations, the findings of the current research indicated that White British children outperformed both British Pakistani and Pakistani children on ToM tasks. These findings are in line with the previous literature that suggests a significant lag for Asian children, when compared to American or European children on FB tasks (Liu et al. 2008). The current findings provided support for the social constructivist point of view that ToM is influenced by cultural experiences and is not universal or innate (Vinden 1999; Carpendale and Lewis 2004). A particularly interesting finding of the current study was that the performance of British Pakistani children was similar to that of Pakistani children.

British Pakistani children showed more similarity to children living in Pakistan, than to the White British children that shared their school environment. These fascinating results also provide support for the role of cultural experiences in development of ToM in early childhood. Specifically, these findings appear to support the 'collectivist vs. individualist culture hypothesis' (Liu et al. 2008; Shahaeian et al. 2011). This hypothesis suggests that the variations in preferred values of these cultural systems (such as interdependence vs. autonomy) can explain the lag observed in mental state understanding among Asian children. A similar trend was also observed for EF skills, where White British children outperformed both British Pakistani and Pakistani children, and there were no significant differences in the performance of both latter groups. Again, the British Pakistani children showed more similarities to children from another country, than to those sharing their country of residence.

The findings that the British Pakistani participants performed similar to Pakistani participants provided strong support for the role of culture in the development of cognitive abilities. Since the study tested young children between the ages of 4-7 years, it can be assumed that they had a greater exposure to the cultural practices inside the home and less to the culture existing outside their homes. The demographic data gathered from parents of British Pakistani participants (N=39) indicated that 54% fathers and 74% mothers were born in Pakistan and later migrated to UK. Almost 90% participants had at least one parent born in Pakistan. Although the data was not available for the entire sample, it does indicate a general trend in the population. Most of these migrations happen at an older age, usually when a person born in Pakistan marries a British Pakistani and migrates to UK. It has been documented that individuals migrating from collectivist to individualist societies struggle to adjust to the new culture (Bhugra 2004). Moreover, Akiyama (2008) suggests that parents serve to reinforce and preserve the second generation's sense of native culture. In line with these suggestions, it appears that British Pakistani migrants who were brought up in Pakistan continue to follow their cultural traditions in rearing up their children in UK. This early exposure to the culture of origin can provide an explanation for similar performance

of children from Pakistan and British Pakistanis living in UK. However, as children grow older and are exposed to the culture outside the home, (in this case to British cultural values) will their ToM ability catch up to that of White British children?

According to the results of one-way analysis of variance conducted separately on different age groups, the performance of three groups differed significantly in 4-5-year-olds. The 4-5-year-old White British children performed significantly higher than both British Pakistani and Pakistani children but no significant differences existed in the performance of the latter groups. However, in 5-6 and 6-7-year-olds, the performance of British Pakistani children on ToM was not significantly different from that of White British children. This could be either due to the exposure to different cultural values outside the home or could possibly be related to the role of educational system. The educational system could also provide exposure to different cultural values such as independence rather than conformity. For instance, in Pakistani schools children are expected to be passive receivers of information and are not supposed to question or disagree with the views of teachers or those provided in the textbooks. British schools on other hand encourage independent thinking, creativity and innovation during the process of learning. It is possible that the emphasis on conformity in Pakistani educational system makes it harder to understand the diversity in opinions or beliefs of others. British Pakistani children attending similar schools as White British children seemed to have caught up on ToM understanding in the second year of school. However, 6-7-year-old Pakistani children still performed significantly lower than White British children, though their performance was not significantly different from British Pakistani participants. These findings indicated that the cultural norms play an important role in the development of ToM in younger children; however, exposure to alternate cultural practices in the schools may help improve the ability to understand different mental states. It would be interesting for future research to explore these differences in children older than 7 years to find out whether the performance of British Pakistani group will improve significantly from that of Pakistani group.

In addition to the general cultural differences the ‘pedagogical hypothesis’ suggested that the children who start school earlier have an advantage over those who start school about a year later (Lecce and Hughes 2010). In the current research participants from all cultural groups started school at the same age (i.e., 4 years). It appears that starting school at the same age as White British children is not helping improve the ToM ability of Pakistani or British Pakistani children. There seem to be other factors at play here. One possible difference, apparent in the demographic data available for the participants, indicated that the majority of the Pakistani children did not attend day care or nurseries, as compared to White British and British Pakistani children. Nurseries and day-care centres offer an opportunity to interact with other children, which can be helpful in enhancing ToM skills (Hughes and Dunn 1998). However, this argument does not explain the differences in the ToM ability in White British and British Pakistani groups, the majority of whom had attended nursery. Lecce and Hughes (2010) noted that although Italian children started school at 6 years (at least a year later than British participants), almost all the participants had been attending kindergarten from age 3. Nevertheless, this early exposure to peers did not help enhance the ToM skills of Italian children compared to British children.

A more plausible explanation for the cultural variations in ToM could be the differences in pedagogical strategies used in various educational systems (Lecce and Hughes 2010; Wang et al. 2016). As mentioned in the introduction section, the public and local private schools in Pakistan heavily emphasize acquisition of knowledge through repetition or memorizing (Jaffer 2005; Sultana 2001). This emphasis on rote learning promotes conformity rather than promoting independent thinking skills and creativity. In addition, in the Pakistani educational system, teaching is mainly instructor-lead and provides very little opportunity for individual attention to children. Children are expected to do as they are instructed and the focus of teachers is mainly on completing the specified syllabus in time. Whereas, in the UK education is more focused on the needs of individual children and is basically student-centred. Children are encouraged to participate in the process of learning and are encouraged to express their opinions. Wang et al. (2016) found

that children from local Chinese schools, that used similar pedagogical strategies as Pakistani schools, performed significantly lower on ToM tasks when compared to British children. However, no such differences were found in performance of children from Hong Kong international schools that used inquiry based pedagogical strategies. If pedagogical experiences play a greater role in ToM development than other cultural differences, then the British Pakistani children going to British schools should have performed similar to White British children on ToM tasks. This appeared to be true for 5-6 and 6-7-year-old British Pakistani children. In the first year of school (at 4-5 years of age), the performance of British Pakistani children was significantly lower than that of White British children. However, in the second and third years (5-7 years of age) no significant difference could be found in the performance of the two groups on ToM tasks. These findings, appeared to indicate that the mental state understanding is probably not much affected by the age at which children start schooling, rather the pedagogical strategies that are used in different schooling systems appear to be more effective.

Variations in ToM understanding could also be influenced by other specific cultural practices. For example, in the current research, variations were reported in the frequency of storybook reading between cultures. According to the information provided by parents, 83% of White British participants reported reading storybooks to their children frequently. Compared to this only 20% British Pakistani parents and 11% Pakistani parents reported reading books to their children frequently. Other studies have also shown the regularity of book reading practices of British parents (Heath 1986; Se´ne´chal et al. 1998), however, no such data is available for Pakistani or British Pakistani parents. Recent research literature suggests that reading books to children contributes to their social cognitive development (Ziv et al. 2013). Existing literature also supports the association between parent-reported frequency of reading books and children's performance on false belief tasks (Adrian et al. 2005). Moreover, joint book reading activity provides parents opportunities to expose children to mental state language and encourage them to reflect upon the mental states of the story characters by asking children what the character may be feeling or thinking (Symons et al. 2005). Several studies

investigating the discourse during joint story book reading sessions indicate that mothers who made frequent references to mental states of story characters had children who performed better on standard false belief and emotion understanding tasks than children of mothers who did not refer to emotions or other mental states (Adrian et al. 2005; Garner et al. 1997; Turnbull and Carpendale 1999). Thus, cultural variations in daily activities, such as low frequency of book reading activities reported by Pakistani and British Pakistani parents could be associated with children's comparatively low performance on ToM tasks.

Furthermore, the delay in ToM development of Pakistani and British Pakistani children might also be explained by the quality of parent-child conversations in early childhood. The frequency of maternal mental state talk (such as references to needs, desires, emotions etc.) has been related with later ToM understanding in children (Ruffman et al. 2002; Adrian et al. 2007). Although, there is no data available to evaluate the discourse of parent child conversation for Pakistani children, it can be assumed that there may exist quantitative, as well as qualitative, differences in the ways parents communicate with their children. For example, as there is a great emphasis on obedience in Pakistani culture, the parents expect their children to do as they are told without providing any explanation for the instructions. This eliminates the opportunity for the child to discuss the situation and understand the perspective of parents or to come to a mutual agreement. Similarly, many parents discourage asking a lot of questions, and reasoning with parents is considered disrespectful. These practices reflect a general attitude of the society where children are not treated as thinking individuals who are entitled to having their own opinions. Similar to teachers, the parents' emphasis is also on increasing the child's factual knowledge, rather than helping the child to develop their analytical skills. These variations in the content of maternal conversations may reflect in the child's ability to understand mental states. For instance, contrasts in conversation have been reported for Italian and British mothers; where Italian mothers asked more test questions (such as 'what is that?' or 'what sound does a cat make?') compared to British mothers who asked more real question such as 'are you hungry?' or 'what would you like to do?' (Tardif

et al. 1997). Accordingly, variations have also been reported in ToM ability of British and Italian children where British children outperformed Italian children on ToM tasks (Hughes et al. 2014). These studies indicate the importance of parental attitudes reflected in their conversations with young children for the development of ToM skills. It would be fruitful for future research to investigate the cultural differences in the conversation styles and usage of mental state language of Pakistani parents.

4.7.3 Cultural Variations in EF

Regarding EF, the difference found in the performance of various cultural groups could possibly be attributed to dissimilarities in collectivist vs. individualist cultures. Several variations have been reported in cognitive components (processing of information, attention, perception, causal inference and organization of knowledge) for Eastern (collectivist) vs. Western (individualistic) cultures (Ji, et al. 2000; Masuda and Nisbett 2001; Unsworth et al. 2005; Gutchess et al. 2006). Specific differences in EF have also been found in Eastern and Western samples (Sabbagh et al. 2006; Wang et al. 2016). However, the direction of this difference was opposite to our findings. Sabbagh et al. (2006) found that Chinese children outperformed their American counterparts on measures of EF and a similar trend was also reported for Japanese children who had an advantage over British children (Wang et al. 2016). On the contrary, in the current research participants from a collectivist Eastern culture (Pakistani and British Pakistani) performed worse than the participants from an individualist Western culture (White British). Although Pakistan is a collectivist society like China and Japan, there still are many variations within these cultures that could account for lower performance of Pakistani children. For example, the parenting strategies and styles used by Chinese and Japanese parents appear very different from Pakistani parents in terms of involvement and stimulation provided to children.

Recent research in the field has related the emergence of EF abilities to parenting styles and parental involvement (Hughes and Enosr 2009; Hammond et al. 2012; Clark et al. 2013; Fay-Stammbach et al. 2014). Specifically two parenting behaviours, parental scaffolding and stimulation have been strongly linked to EF

skills (Bernier et al. 2010; Hammond et al. 2012; Clark et al. 2013). Scaffolding refers to providing verbal or nonverbal guidance in completing tasks (Lewis and Carpendale 2009) as well as supporting children's' choices, opinions and decisions (Matte-Gagne and Bernier 2011). Parental stimulation includes providing enriched environment and opportunities for growth of cognitive skills (Bradley et al. 2011). Pakistani parents in general do not focus on providing opportunities for the cognitive growth of their children. Multiple reasons for this behaviour can be identified. First, as mentioned above the focus is on instilling conformity, obedience and dependence in children, and many parents do not encourage children to have, or to express, their opinions. Children are hardly involved in decision-making processes at home, or in making every day decisions for themselves (such as what to wear or what to eat). Secondly, due to the lack of education many parents are not well aware of the importance of early years in cognitive development. This may explain why parents do not bother to involve children in activities such as reading books or making drawings. Thirdly, in most of the Pakistani households' children do not have enough time to engage in academic or non-academic activities at home. After the school timing, many children go to tuition centres for additional academic support, and to mosques for learning Quran. Children hardly get any time for play during the day. Finally, lack of parental involvement could also be due to economic reasons. Families prefer to spend on necessities, rather than spending on children's games or other developmental activities. Socio economic status has also been reported as a predictor of EF abilities (Hughes et al. 2009). Pakistan is a developing country and per capita income is very low compared to other developed countries. According to the statistics of the World Bank (2017), per capita income in Pakistan was $1,440 in the year 2015 compared to $43,700 for UK, $38,840 for japan, and $7,900 for china. The current findings give rise to a need to assess the role of parental involvement and parent-child relationships in a Pakistani sample, in order to understand the EF abilities of Pakistani children.

Furthermore, the current research findings suggest that the EF ability of Pakistani children improved during the school years. This is evident from the results conducted on each school year separately. In Reception (4-5 year olds)

White British participants' performance was significantly ahead of Pakistani and British Pakistani participants. However, in Year 1 (5-6 year olds) there was no significant difference between the performances of White British and Pakistani children, although, British Pakistani children still performed significantly lower than White British participants. And in Year 2 of school there were no significant differences in EF abilities of all cultural groups. These findings imply that formal schooling allows children to improve their EF skills. In schools, children are expected to follow instructions, make queues, remain seated during class timings, show discipline, and inhibit inappropriate behaviours. These experiences can potentially contribute to enhancing EF skills in children (Burrage et al. 2008). In addition, schools often provide opportunities for activities (educational toys, games, story books, etc.) which children may not have at home due to economic reasons. Burrage et al. (2008) found a small to moderate effect of formal schooling on development of EF in elementary school. Hughes, et al. (2009) found that verbally less able children showed a catch-up effect across the transition to school. The findings of the current research also provided support for the effect of formal schooling on EF development.

4.7.4 Cultural Variations in Social Competence

Regarding cultural differences in social competence, the White British participants were rated higher on pro-social subscale of MASCS than both British Pakistani and Pakistani participants. Furthermore, the Pakistani participants were also rated significantly higher than British Pakistani participants. There were no significant cultural differences on antisocial subscale of MASCS. It was hypothesized in the current study that the group of children with advanced ToM skills would outperform other groups on social competence. The above-mentioned findings provided partial support for this hypothesis since White British children with advanced ToM skills outperformed both Pakistani and British Pakistani children. However, the difference in Pakistani and British Pakistani children's social competence cannot be explained by this hypothesis since both the groups performed similar on ToM tasks.

One possible explanation for this discrepancy could be found in literature on immigrant populations. Research indicates that immigrant children exhibit more behavioural problems than the native children (Stevens et al. 2003; Reijneveld et al. 2005; Vollebergh et al. 2005; Gross et al. 2006; Jansen et al. 2010). This could be due to several factors associated with immigration such as language difficulty, lack of parental education, lower economic status and parental psychopathology (Bhugra 2004 Lerner et al. 2005). High levels of behavioural problems in immigrant children could be a possible reason for the low ratings of British Pakistani children on social competence. Regarding immigrant population it has also been suggested that when teachers perceived parents as having discrepant values, they rated students more negatively on academic competence and behavioural problems (Sirin et al. 2009). In addition it has also been suggested that observed differences across ethnicity can be explained to some degree by a rater-bias (Sonuga-Barke et al. 1993). However, due to lack of any other source of information it is hard to conclude whether these differences were due to a rater-bias or actual differences in behavior.

4.7.5 Relationship between ToM, EF and Social Competence

As expected ToM had a significant positive relationship with EF after controlling for age. There is sufficient empirical evidence to support this link between ToM and EF (Carlson and Moses 2001; Hughes and Graham 2002; Carlson et al. 2004; Hughes and Ensor 2007; Oh and Lewis 2008; Devine and Hughes 2014). In addition, the relationship between ToM and EF was consistent in all the cultural groups. These findings provided further support for the universality of links between ToM and EF (Chasiotis et al. 2006; Sabbagh et al. 2006; Devine and Hughes 2014). It is evident from the findings of current study that ToM remains closely knitted to EF irrespective of the variations in cultural norms and practices. However, whether EF facilitates the expression or emergence of ToM remains questionable. The current research findings appeared to be supporting the emergence account, since EF seems to develop earlier than ToM skills. Pakistani participants who caught up with White British participants on EF skills in Year 2 had still not matched White British participants on ToM skill. This indicated that EF

skills developed earlier than, and arepossibly required for, the emergence of ToM skills.

There was a significant positive relationship in ToM and pro-social scale of MASCS after controlling for age. This is line with previous research that indicates that teachers rate children with better understanding of TOM as more socially competent (Astingtion 2003). In addition, there was a significant negative relationship between ToM and the anti-social scale of MASCS. The current research findings suggested that children with advanced ToM exhibit more co-operative behaviours and show empathy for their peers. On the contrary, children with lower ToM skills are rated higher on disruptive (such as throwing temper tantrums) and impulsive behaviours.

Age, ethnic group, EF and pro-social behaviours were identified as significant predictors of ToM in the current research. Together these variables explained 36% variance in ToM ability. EF amongst all the variables explained the most variance in ToM followed by age. ToM was also identified as a significant predictor of social competence along with ethnic group. ToM explained about 3% variance in social competence compared to 1% variance explained in ToM by social competence. These findings provided support for the view that the relationship between ToM and social competence appears to be bidirectional (Razza and Blair 2009). However, since the current study was a cross-sectional study the predictive relationships are only concurrent and not longitudinal.

4.8 Chapter Summary

This chapter presented a study that investigated cultural differences in ToM development and the universality of links between ToM, EF and social competence. Children from three cultural groups (White British, British Pakistani, and Pakistani) were tested on tasks of ToM, EF and social competence. These cultural groups presented three cultural orientations; individualist culture (White British), collectivist culture (Pakistani) and a mix of both individualist and collectivist cultures (British Pakistani). The main findings of the current research indicated that the White British children outperformed both Pakistani and British Pakistani on

ToM tasks. These findings are in accordance with the social constructivist perspective, which suggests that cognitive abilities are influenced by cultural practices in early childhood (Vinden 1999; Carpendale and Lewis 2004). Specifically, the current research findings provided support for the 'collectivist vs. individualist culture hypothesis' (Shahaeian et al. 2011; Liu et al. 2008). This hypothesis suggests that general variations in collectivist and individualist cultures can explain the variations in ToM acquisition. The current research also contributed to the 'pedagogical hypothesis' by indicating that the pedagogical strategies used in different schooling systems might influence the child's ability to understand mental states. Significant cultural differences were also identified in EF and social competence of participants. Possible explanations for these differences have been discussed. The current research findings also provided support for the universality of links between ToM, EF and social competence. Furthermore, age, ethnic group, EF and pro-social skills were identified as significant predictors of ToM.

Chapter 5

Influence of parenting Styles and Maternal Mental State Talk on ToM ability and Social Competence

5.1 Introduction

As mentioned earlier in the previous chapters Theory of mind (ToM) is a cognitive ability that allows children to understand that the behaviours of other social agents are the products of their internal mental states (such as beliefs and desires), and that these mental states are distinct from the child's own mental states (Doherty 2009). In recent years research on ToM has focused on exploring the factors that contribute to variations in mental state understanding. Consequently, a number of social factors have been identified that account for differences in understanding of mind. These factors include, type and size of families, number of siblings, language skills, parent-child conversation and interaction with peers (Perner et al. 1994; Ruffman et al. 1998; Ruffman et al. 2002; Meins et al. 2003; Ensor and Hughes 2008). Furthermore, cross-cultural research has highlighted the role of cultural norms and practices in the development of mental state understanding (Wellman et al. 2001; Liu et al. 2008). Some cultural variations in mind understanding have been associated with general differences between collectivist and individualist cultures; such as emphasis on conformity and knowledge acquisition versus fostering free-will and independence (Shahaeian et al. 2011; Mayer and Trauble 2013). Others focus on more specific variations such as parent-child interaction and pedagogical experiences within the collectivist and individualist cultures (Lecce and Hughes 2010). These findings highlight the importance of and the need to further investigate early childhood experiences of children from diverse cultural backgrounds.

A previous experiment conducted by the author as part of the same PhD research (chapter 4) also investigated cultural variations in the development of ToM and its association with EF and social competence. The findings of the experiment indicated that the white British children exhibited significantly higher levels of ToM ability than the British Pakistani or Pakistani children. Interestingly there was no difference in British Pakistani and Pakistani children's ToM ability, despite the fact that British Pakistani children are living in similar environment as white British children and go to similar schools. These findings emphasize the role of early experiences of these children at homes rather than the larger society they live in. Another important finding of this cross-cultural experiment was a statistically significant relationship of parental book reading with ToM, EF and SC. The children whose parents read books to them frequently appeared to have better understanding of mental states, higher EF skills and exhibited more pro-social behaviours compared to those children whose parents rarely or never read books to them. There was also a significant difference in terms of parental book reading in three cultural groups, with British parents scoring highest on the variable. These findings yet again signify the role of early environmental experiences in the acquisition of mental state understanding

One of the most significant early influences in a child's life is a parent. Parents assume the responsibility to care for the needs of an infant and guide them towards becoming an autonomous social being. In these early years parents' styles of care giving and other child rearing practices can have lasting effects on children's functioning in all spheres of life. For example parenting styles have been associated with multiple child outcomes such as academic achievement, social skills, self-esteem, self-efficacy and behavioural as well as psychological problems (Maccoby and Martin 1983; Milevsky et al. 2007; Simons and Conger 2007; Milevsky et al. 2008; Baumrind et al. 2010). There is also some evidence to link parenting styles to children's ToM development (Hughes et al. 1999). Furthermore, frequency as well as content of the language that mothers use in their interactions with children has also been reported to influence children's ability to understand mental states. Specifically, mothers' use of mental state words (such as need,

desire, want etc.) has been related with later theory-of-mind understanding in children (Ruffman et al. 2002; Adrian et al. 2007). Both these factors (i.e. parenting styles and maternal mental state talk) and their link to ToM is further discussed below.

5.2 Parenting Styles

Parenting styles are generally defined as patterns of behaviours exhibited during parent-child interactions in a wide range of situations that create a pervasive emotional climate (Darling and Steinberg 1993). In 1960s Diana Baumrind presented a classification of parenting styles that has been widely accepted and used in parenting literature. She identified three distinct styles of parenting, largely referred to as authoritative, authoritarian and permissive. Later work on parenting styles (Macoby and Martin 1983) elaborated it as the degree of parental responsiveness and demandingness displayed in child rearing practices. Parental responsiveness refers to warmth, acceptance and reasoned communication (Baumrind 2005). It allows parents to foster individuality and autonomy in their children by providing support and being attuned to their needs and desires. Demandingness on the other hand is characterized by the degree of control and supervision exerted by parents (Baumrind 2005). It includes socializing children by behavior regulation, confrontation, control and monitoring their activities. A combination of low or high responsiveness and demanding behaviours constitute different parenting styles. The authoritarian parents are high on demandingness and low on responsiveness whereas authoritative parents are high on both. Permissive parents on the other hand exhibit high responsiveness behavior and low demandingness behavior. The parenting styles suggested by Baumrind and child outcomes associated with them are further explained below.

5.2.1 Authoritarian Parenting

Authoritarian parents generally are very demanding of their children and often show low levels of nurturance and responsiveness. This style of parenting is characterized by rigid disciplinary rules, controlling and shaping the behaviours of child according to a fixed standard of conduct and forceful punitive measures to restrain any disagreements (Baumrind 1966). Authoritarian parents value

obedience and conformity and expect that their directions and rules should be obeyed without providing any explanation. Authoritarian parents do not engage in open communication and discourage verbal give and take, which deprives the child of an opportunity to have or express opinions that may conflict with those of parents. The child is allowed very little say in making decisions and therefore lack the ability to take initiatives later on in life. This parenting style is associated with low self-efficacy, low self-esteem, poor social skills, more externalizing problems, and high levels of depression (Maccoby and Martin 1983; Milevsky et al. 2007; Baumrind et al. 2010). However, Hoskins (2014) reported that the effects of authoritarian parenting vary with the type of communities and cultural settings these families are living in. For example, more negative behavioural outcomes are associated with highly restrictive parenting in Caucasian sample (Lansford, et al., 2004) but not in other ethnic groups such as Hispanics (Parke and Buriel 2006). It has also been reported that high levels of parental control is associated with positive outcomes in minority groups living in high-risk communities (Mason et al. 2004; Steinberg et al. 2006). Highly restrictive and controlling parental behaviours in high-risk communities are considered as necessary and acceptable for protecting the child from harmful situations. Similarly, in cultures where discipline and high control is considered normative authoritarian parenting style is associated with neutral effects on adolescents (Parke and Buriel 2006). For example, strict parenting practices and control is valued in Asian cultures that put a lot of emphasis on child obedience. Steinberg et al. (1994) found that authoritarian parenting was associated with more positive outcomes such as enhanced adjustment and academic performance in Asian Americans and with more negative outcomes in European Americans.

5.2.2 Authoritative Parenting

Authoritative parents are high on both dimensions of parenting i.e. responsiveness and demandingness (Baumrind et al. 2010). Hoskins (2014) argues that although both authoritarian and authoritative parents place high emphasis on control, the manner in which they exert control is very different. As compared to punitive styles of control observed in authoritarian parents, the

authoritative parents practice monitoring or supervision, set limits for their children and use reasoning to enforce them. Furthermore, authoritative parenting style is associated with open communication, verbal give and take, warmth and encouragement (Baumrind 1966). Although authoritative parents enforce their own perspective but also recognize the child's needs and interests (Baumrind 1966). In doing so they value and foster autonomy and independence in their children. This parenting style has been linked to many positive child and adolescent outcomes and has been considered the most advantageous parenting style (Hoskins 2014). Empirical evidence indicates that authoritative parenting is associated with high self-esteem, self-reliance, social responsibility, school commitment, adjustment, and life satisfaction (Baumrind 1971; Simons and Conger 2007; Milevsky et al. 2008; Baumrind et al. 2010). Furthermore, children of authoritative parents are less likely to engage in externalizing behaviour and drug use and report lower levels of depression (Fletcher and Jefferies 1999; Steinberg and Silk 2002; Simons and Conger 2007). Research evidence indicates that the positive effects of parenting increase when both parents engage in authoritative parenting, however, the presence of even one authoritative parent is beneficial for the child (Bronte-Tinkew, et al. 2006; Simons and Conger 2007).

5.2.3 Permissive Parenting

Permissive parents exhibit higher levels of responsiveness and lower levels of control and restrictiveness. They behave in an accepting and affirmative manner towards the child's desires, impulses and actions and involve them in the process of rulemaking and family decisions (Baumrind 1966). These parents place very few behavioural demands or responsibilities on their child (Baumrind 1966). They allow the child to regulate his/her own self and do not exercise control or overt power to shape or alter their behaviours (Baumrind 1966). Furthermore, permissive parents have been characterized as indulgent and allow children to make their own rules and decisions (Maccoby and Martin 1983). Less optimal child and adolescent outcomes are associated with this parenting style. It has been reported that the children of permissive parents exhibit lower levels of autonomy, low self-esteem and a lack of impulse control (Baumrind 1971; Maccoby and Martin 1983;

Baumrind et al. 2010). These children tend to be less engaged in schools, have an extrinsic motivation and have lower academic achievement (Ginsburg and Bronstein 1993). Furthermore, the children of permissive parents report a higher frequency of substance use and school misconduct (Querido et al. 2002)

5.2.4 Parenting Styles and TOM

The research on parenting styles' relation to ToM has yielded inconsistent findings with some studies showing no relationship between parenting styles and the child's ToM ability, whereas others indicating significant links between ToM understanding and authoritative and authoritarian parenting styles. Vinden (2001) tested 3 to 6 year old Korean American and Anglo-American children on ToM tasks. Mothers of the participants provided ratings on Parental Attitude Inventory, which measured parenting styles on three subscales; Autonomy (similar to Baumrind's Authoritative style), conformity (similar to authoritarian style) and freedom to learn (this subscale is not a part of Baumrind's typology). The findings revealed no significant relation in parenting styles and ToM development in any culture despite the fact that Korean American children, whose mothers practiced more authoritarian parenting styles as compared to Anglo mothers, outperformed Anglo American children on measures of emotion and mind understanding. Similar findings were also reported in a longitudinal study of 55 middle and upper class children who were tested at 3 years and again at 4 years of age (Ruffman et al. 2006). No significant relation was found between general parenting practices of mothers and Tom scores of their children.

In contrast to above-mentioned studies, several researchers have found significant links between parenting attitudes and children's mental state understanding (Hughes at el 1999; Pears and Moses 2003; O'Reilly and Peterson 2014). For instance, Hughes at el (1999) investigated the relationship between parenting and ToM in a sample of Caucasian twin pre-schoolers. They tested children on 8 false belief and 2 deception tasks and parenting was measured in terms of parental warmth/negativity and positive (praise, rewards and explanation) and negative control (criticism or physical control). They found that mental understanding related positively with parental warmth, although this relation was

not significant when verbal ability was controlled. In addition ToM was negatively correlated with measures of parental negative control, and this relationship remained significant even after controlling for verbal IQ. The findings of Hughes et al. (1999) provide some support for negative relation between ToM and features of authoritarian parenting (warmth dimension). Another study investigated the link between mental understanding (measured on tasks of perception, desire, belief and emotion) and parental discipline techniques in 142 children between 3-5 years of age (Pears and Moses 2003). The findings indicated a negative association between power assertive discipline techniques (such as yelling and spanking) and belief understanding even after controlling for the effect of age, cognitive ability, and demographics. A far more convincing evidence for the link between ToM and parenting styles comes from a recent study that used direct measures of authoritarian and authoritative parenting styles (O'Reilly and Peterson 2014). Findings from a sample of 30 Anglo-Australian children (aged 5–12) indicated that children's mental state understanding as measured by Wellman and Liu's ToM scale related significantly to parenting styles. Specifically, after controlling for the influence of age and verbal ability, ToM sores had a negative relation with authoritarian, and a positive relation with authoritative parenting. Taken together the findings of above mentioned researches indicate that parenting characterized by high levels of demanding and low levels of responsiveness has unfavorable effects on ToM development. On the other hand parental control techniques that involve less punitive methods such as reinforcement, monitoring and reasoning combined with parental warmth, acceptance and reasoned communication can have beneficial effects on the ability to understand mental states.

5.2.5 Parenting Styles, Executive Functioning and Social Competence

In recent years researchers have started exploring the social processes involved in the development of EF. Many studies have indicated positive effects of sensitive parenting on the EF abilities of children. Bernier et al. (2010) investigated the probable links between parent-child interactions and subsequent child EF. They assessed parent-child interactions at 12 and 15 months of age in terms of maternal sensitivity, mind-mindedness and autonomy support. EF skills (working

memory, impulse control and set shifting) were tested at 18 and 26 months. The findings indicated that all three dimension of parenting were related to child EF with autonomy support being the strongest predictor of child EF at each age. In other studies attachment security and parental scaffolding at an early age was related to EF performance at later ages (Bernier et al. 2012; Hammond et al. 2012; Lowe et al. 2014; Bernier et al. 2015). As autonomy support, maternal sensitivity and scaffolding are associated with authoritative parenting styles, it can be concluded that authoritative parenting has beneficial effects for EF. On the other hand, high parental control has been associated with lower EF abilities (Bindman et al. 2015; Hutchison et al. 2016).

Research on parenting styles and social competence has generally associated authoritative parenting style with more positive social outcomes in children. Lamborn et al. (1991) tested 4100 adolescents on perceived parenting styles and its relation with 4 adolescent outcomes; psychosocial development, school achievement, internalized distress, and problem behaviour. The findings of the study indicated that adolescents who perceived their parents as authoritative performed highest on psychosocial competence and lowest on measures of psychological and behavioural dysfunction. On the other hand, adolescents with authoritarian parents, scored high on measures of obedience and conformity to the standards of adults but had relatively poorer self-conceptions. Chen et al. (1997) examined the association between authoritative and authoritarian parenting styles and social and school adjustment in Chinese children. They used teacher ratings for school related social competence and data regarding parental practices was collected from parents. Results showed a positive association of authoritarian parenting with aggression and a negative association with peer acceptance, sociability-competence, and academic achievement. On the contrary, authoritative parenting styles was associated positively with social and school adjustment and negatively with adjustment problems. A longitudinal study of Mexican American adolescents revealed that authoritative parents were more likely to have children who demonstrated higher levels of pro-social behaviours than authoritarian and permissive parents (Carlo et al. 2017). In another study authoritative parenting

style was positively associated with social competence whereas authoritarian parenting style was negatively correlated (Mensah and Kuranchie, 2013). Likewise, Altay and Gure (2012) reported that children of authoritative mothers showed more pro-social behaviours compared to children of permissive mothers. In sum, it appears that authoritative parenting style characterized by warmth, involvement, verbal give and take and autonomy support, has favourable effects on children's social skills as compared to any other parenting style. However, variations in effects of parenting styles on social competence may exist in different cultural contexts. For example authoritarian parenting and high levels of control have been associated with more positive outcomes such as enhanced adjustment and academic performance in Asian Americas and minority groups living in high risk communities (Steinberg et al. 1994; Mason et al. 2004; Steinberg et al. 2006).

5.2.6 Cultural Variations in Parenting Styles

There is substantial evidence to support that parents' belief systems, values and practices are influenced by their specific cultures (Tamminen, 2006). In accordance, parenting styles are also influenced by the prevalent norms and values of a culture and therefore vary across different cultures. Some of these variations have been explained by contrasting the two major cultural systems; collectivist and individualist. These two cultural orientations have been reported to influence many aspects of human thought and behavior such as sense of self, emotions, morality and interpersonal relationships (Triandis 2001). Greenfield and Suzuki (1998) suggested that collectivist and individualist cultures emphasize achieving different objectives from the process of socialization. In collectivist cultures the preferred endpoint of development is interdependence whereas in individualist cultures the goal of socialization is to produce autonomous and independent individuals (Greenfield and Suzuki 1998). These major aims of the socialization process also reflect in parenting practices of collectivist and individualist cultures. In collectivist cultures parents emphasize obedience, conformity, cooperation, adherence to rules and interdependence (Greenfield and Suzuki 1998). While in individualistic cultures the values promoted by parents are emotional independence, assertiveness and autonomy (Greenfield and Suzuki

1998). These values for parenting correspond to the authoritarian parenting in collectivist cultures and authoritative parenting in individualist cultures. Dornbusch et al. (1987) reported that Asian students rated their parents higher on authoritarian style, and lower on authoritative style. Similar findings were also reported by Vinden (2001) who found that Korean American mothers practiced more authoritarian parenting than the Anglo American mothers. Likewise, Chinese parents were reported to be more authoritarian compared to American and Australian parents (Leung et al 1998).

In addition, as mentioned earlier, authoritative and authoritarian parenting styles have been associated with somewhat different child outcomes in collectivist vs. individualist cultures. Negative behavioural outcomes are associated with authoritarian parenting in Caucasian sample (Lansford et al. 2004) but not in some other cultural groups (Parke and Buriel 2006). For example, high levels of parental control was associated with positive outcomes in minority groups living in high risk communities (Mason et al. 2004; Steinberg et al. 2006) and with enhanced adjustment and academic performance in Asian Americans but not in European Americans (Steinberg et al. 1994). In another study it was reported that Malay adolescents who perceived their mothers as authoritarian had better adjustment in attitude towards school compared to those who perceived their mothers to be authoritative (Rebecca 2006). Leung et al. (1998) compared Chinese, American and Australian children's academic achievement and its relation to parenting styles. The findings indicated that academic achievement was positively associated with authoritarian style in Chinese sample, and with authoritative parenting style in American and Australian sample.

Pakistani society is a collectivist society that places strong emphasis on obedience and conformity to societal rules. Research on parental styles in Pakistan indicates both positive and negative associations of authoritarian parenting styles. Khan, et al. (2014) reported that Academic achievement was unrelated to authoritative parenting style among postgraduate Pakistani students but was positively related to authoritarian parenting styles. Rizvi and Najam (2015) investigated the links between behavioural and emotional problems and parenting

styles of both mothers and fathers among a sample of 300 Pakistani adolescent from an urban setting. The findings of their study revealed a negative association of behavioural and emotional problems with authoritative parenting styles of both the parents. These findings indicate that the parents who adopt the strategies of open communication, reason based control and acceptance in their parenting practices had children who exhibited lower levels of behavioural and emotional problems. There is a need to further investigate parenting styles and its relation to child outcomes in Pakistani sample to clarify these inconsistencies.

Investigating parenting styles in relation to TOM in current study is significant for two reasons. First, since the findings on link between ToM and parenting styles are inconsistent, it is important to investigate this link in various cultural groups to further clarify how parenting influences ToM development. Furthermore, findings from a collectivist culture will help establish the universality of link between parental styles and ToM. Second, as empirical evidence indicates that child outcomes of parental styles differ in collectivist cultures or Asian communities compared to Caucasian samples, investigating the links between mental understanding and parenting in a collectivist Asian culture will clarify whether this link is effected by the cultural values. In this regard, studies from Caucasian cultures have indicated a positive link between authoritative parenting styles and negative links between authoritarian parenting style and ToM. However, authoritarian parenting in Asian cultures has been linked to positive or neutral child outcomes. In this case there should be either a positive or no relationship between Authoritarian parenting style and ToM.

5.3 Parental Mental State Talk

Conversations are an important aspect of parent-child relationship. Empirical evidence indicates that verbal exchange between parent and child can influence the development of theory of mind (Garner et al. 1997; Turnbull and Carpendale 1999). Specifically, references made to mental states by mothers during conversations are of particular importance for developing an understanding of mind (Ruffman et al. 2002; Adrian et al. 2007). Symons (2004) has suggested that exposure to language about mental states enables the child to internalize the

notion that thoughts and desires reside in the minds of others. He further argued that 'internalization' as proposed by Vygotsky refers to a cognitive reorganization and not just imitation or replication of the stimuli. So in this case, exposure to conversations about mental states with adults promotes genuine representational understanding of mental states in children rather than just imitating the words that they hear. Moreover, discourse about links between emotion and behaviours allows children to develop an understanding of their own emotions and about the behavior and emotions of others (Dunn et al. 1991; Denham et al.1994; Laible and Thompson 1998).

Researchers interested in investigating links between parental use of mental state words and child mental understanding have often used joint book reading activity to observe parent-child verbal exchanges. For example, Garner et al. (1997) examined mothers' mental state references about the emotions of the characters while they read a wordless storybook with their children. They found that children whose mothers explained the causes and consequences of emotions performed better on emotional understanding tasks than children of mothers who made fewer references to emotions. Similarly Symons et al. (2005) examined mental state discourse during parent-child interaction while reading a storybook that had surprise ending about the identity of the main character. Parental mental state discourse during joint reading activity was related to false belief understanding of the child. In a longitudinal study Ruffman et al. (2002) asked mothers to describe some pictures to their child at three time points during a year. Using Bartsch and Wellman's (1995) criteria for categorizing mental state utterances, they coded maternal mental state utterances as 'desire' (e.g. want, wish, like etc.), 'emotions' (e.g. sad, happy, scared etc.), 'cognitive terms' (think and know) 'modulations of exertion' (e.g. may, suppose, guess etc.) and 'general mental states' (e.g. remember, understand, consider etc.). They found that mother's use of mental state words at earlier time points was correlated with later mental state understanding in children even after controlling for a number of potential mediators such as child's own use of mental state words, age, verbal ability and mother's education. In addition mental state utterances of mothers also

predicted child mental state utterances concurrently and one year later. Similar findings were also reported in another longitudinal study that tested the link between maternal mental state talk and ToM ability of 55 middle and upper middle class children (Ruffman et al. 2006). Maternal references to mental states at 3 years of age uniquely related to performance on ToM tasks at 4 years of age. Similar links have also been found for younger children. For example Taumoepeau and Ruffman (2006) found that maternal references to child's desires at 15 months of age predicted children's mental state language and emotion understanding at 24 months of age. Furthermore, maternal references to thoughts and knowledge of others at 24 months predicted children's later mental state language at 33 months (Taumoepeau and Ruffman 2008).

Variations have been reported in mothers' use of mental state words in different cultures. For instance, Doan and Wang (2010) examined mother's references to mental states and external behaviours and its link to emotion situation knowledge in 71 European American and 60 Chinese immigrant mother-child dyads. Their findings revealed that European American mothers made more references to thoughts and emotions whereas Chinese mothers referred more to behaviours. However, mothers' mental state references predicted children's emotion situation understanding in both cultural groups. Similar cultural variations were also reported in a recent study that compared parent-child pairs from United Kingdom and Hong Kong on ToM and parental mind-mindedness, which refers to parents' tendency to view their children as mental agents (Hughes et al. 2017). Parental mind-mindedness was measured through a brief interview where parents were told to describe the kind of person their child is in 5 minutes. The descriptions provided by parents were then coded as mental (descriptions referring to child's mental life), physical (referring to appearance), behavioural (referring to behaviours or routines) and general (which did not fit any other category). According to the findings of this study, parents from UK exhibited high mind-mindedness in describing their children than did parents from Hong Kong. In addition parental mind-mindedness was significantly associated with children's ToM in both cultures. Taken together these findings indicate; a) cultural differences in the use of parents'

mental or non-mental description of their child and b) an association between parental mind-mindedness and child's ToM. These and similar findings highlight the importance of investigating parental factors to account for variance in ToM development in different cultures.

5.4 Aims and Objectives

The present study was designed to investigate the links between ToM development and the parental attitudes and use of mental state words. The aim of the current study was to investigate whether the links between parental factors (parenting styles and maternal mental state talk) and children's ToM ability reported in Western studies also hold true in a collectivist Pakistani culture. An additional objective of the study was to investigate how parenting styles or maternal mental state talk relate to the child's social competence.

5.5 Method

5.5.1 Participants

A total of 63 children between 3.08 to 7 years of age were recruited from three schools in Rawalpindi. G-Power software suggested that at least 50 participants will give a power of 0.95 and an effect size of r=0.5 for multiple regression analysis. Only those children were included in the study whose parents volunteered to take part in the study. The mean age of participants was 5 years (SD= .99) and 44% were females. Majority of the participants belonged to Punjabi ethnic group.

5.5.2 Design

The study used a cross-sectional design. Each participant was tested on ToM scale (five tasks) and four EF tasks (presentation was counterbalanced to prevent order effects). Respective teacher for each child provided ratings for social competence. Mothers were invited to school for a book reading session with their child and to fill in a measure of parenting styles.

5.5.3 ToM Tasks

ToM scale (Wellman and Liu 2004) was used to measure ToM development in children. ToM scale consists of five tasks that assess a child's understanding of

different mental states. The mental states assessed by this scale are diverse desire, diverse belief, knowledge access, false belief and hidden emotion. The details of the tasks are included in the previous chapter.

5.5.4 EF Tasks

EF was measured using Day/night stroop tasks, Peg-tapping task and Dimension Change Card (DCC) sorting task. The details of the tasks are provided in the previous chapter.

5.5.5 Measures of Social Competence

Teacher's version of Multisource Assessment of Social Competence Scale (MASCS) was used to assess participants' social competence. MASCS provides scores for two subscales; pro-social and antisocial. More details of the scale are available in the previous chapter. Cronbach's alpha for the current sample was .739 for the prosoical subscale and .746 for the antisocial subscale (see Appendix C).

5.5.6 Measures of Parenting Styles

Parenting Style and Dimension Questionnaire (PSDQ), originally developed by Robinson et al. (1995) was used to measure parenting styles. A revised version of PSDQ that has 62 items was used in the current study. This version of PSDQ has three subscales designed to assess authoritarian, authoritative and permissive parenting styles. The authoritarian subscale has 20 items and is further divided in to 4 subdimensions; verbal hostility, corporal punishment, nonreasoning/punitive strategies, and directiveness. The authoritative subscale has 27 items and consists of four subdimension; warmth/involvement, reasoning/induction, democratic participation, and good nature/easy-going. The permissive subscale contains 15 items and three subdimensions; lack of follow-through, ignoring misbehaviour, and self-confidence. Robinson et al. (1995) reported good reliabilities for the subscales. Cronbach's alpha was reported to be .86 for authoritarian subscale, .91 for authoritative subscale and .75 for permissive subscale.

The questionnaire was translated in Urdu language using back translation procedure. Two bilingual lecturers from the department of English and Behavioural

Sciences, Fatima Jinnah Women University, independently conducted the forward translations from source language (English) to target language (Urdu). The translated versions were then discussed with a panel of 3 Psychology lecturers including the author. The focus of the panel was to identify and resolve any conceptual discrepancies in the translated versions. In addition the panel also ensured that the translations appeared to have semantic equivalence and are not literal translations. At least 17 items were rephrased with the suggestions of panel members. The forward translated versions were then back translated in source language by two independent PhD scholars who were not familiar with the original questionnaire. The back translations were then matched with the original PSDQ and the most appropriate translation from the two versions was selected to be included in the final Urdu version of PSDQ by the author. Cronbach's Alpha for the current sample was .92 for authoritative scale, .91 for authoritarian scale and .54 for the permissive scale (see Appendix C). Olivari et al. (2013) reviewed 53 published articles (from 1995 to 2012) that had used PSDQ for reliability and validity of the instrument. They stated that Cronbach's Alpha reported in 96% articles showed adequate values for authoritarian and authoritative subscales ranging from .71-.97 and .62-.95 for authoritative and authoritarian scales respectively. However, the permissive scale showed lower Cronbach's alpha values ranging from .38- .89. Furthermore, the alpha values for permissive scale were higher (more than .65) in American and Canadian samples than in European, African, Asian, and Oceania samples. These findings indicated that lower alpha value of permissive scale (.54) for the current sample is not due to issues in translation rather a general trend observed in many countries. This could possibly indicate that the items in permissive scale are specific to parental practices in American population and do not measure the construct appropriately in other cultures.

5.5.7 Measure of Maternal Mental State Talk:

Maternal mental state talk (MMST) was assessed during a book reading session. A series of three pictorial storybooks by Mercer Mayer were selected for this purpose. The first book was titled ‘a boy, a dog and a frog’ and shows the pictures of a boy and a dog with a net and bucket roaming around near a swamp where they spot a frog and try to catch it. The second book ‘frog, where are you?’ shows the frog sneak out while the boy and dog slept, they then go to find the frog in various places. The third book ‘Frog goes to dinner’ shows the boy getting ready and leaving his pets (a dog, a turtle and a frog) at home. The frog however, sneaks into the pocket of his coat without the boy’s knowledge and causes chaos at the restaurant resulting in the family being kicked out and the boy having to face parents’ fury. These storybooks were selected to assess MMST for two reasons. Firstly, these books are pictorial and provide no written text other than the title of the book. This would eliminate the chances of mothers just reading the text and would allow them to construct a story in their own words, consequently providing a better measure of the discourse they use with their child in everyday life. Secondly, the books provide many opportunities to discuss the mental states of the story characters. For example in the first book the boy and dog wanted to catch a frog (desire) and plan various strategies (ideas) but when they fail to catch the frog they appeared to be sad (emotions). The frog then followed the footsteps of the boy and dog to reach them (depicting a belief that the footsteps indicate the boy and dog must have walked this way). Finally, the boy and dog were surprised (depiction of emotion) to see the frog reach their hpome. Similarly in the other books the boy is shown to mistake the antlers of a stag as bushes (false belief), the boy and dog appear to look for the frog in a shoe, a beehive and in places where other animals are hiding (false belief, knowledge access). In the last story the frog sneaks into the pocket of boy’s coat without his knowledge (deception/ knowledge access), scares people in the restaurant, annoys the parents of the boy (emotions) and gets them kicked out.

The criteria for coding mental state talk used by Ruffman et al. (2002) and originally proposed by Bartsch and Wellman (1995) was followed in this research. Their criteria included following categories of mental state terms:

1. Cognitive terms: this includes references to ‘think’ and ‘know’ (e.g. I think it’s a dog, the boy does not know, what do you think?)

2. Desire terms: referring to desires such as want, like, wish (e.g. the boy wants to catch the frog, I wish we had a dog)

3. Emotion terms: expressions referring to emotions such as happy, sad, upset, surprised, pleased, enjoy, excited, fun, interested, frustrated, missed (e.g. the boy and dog were really surprised to see the frog, the lady in the restaurant was scared)

4. General mental states: references to other mental states such as remember, realize, idea, consider, forget, imagine (e.g. using a net to catch the frog was a really good idea, remember what we ordered the last time we went to resturant)

5. Modulations of assertion: these include terms such as maybe, suppose, wonder, guess, sure, possible, perhaps (e.g. can you guess what was behind the log?)

The audiotapes of book reading sessions were coded by an independent researcher who had a background in Psychology. A second independent researcher coded 30% of the audios to provide a measure of inter-rater reliability. The inter-rater reliability for individual categories and a composite score was calculated using Cohen’s Kappa. The Kappa values for the categories and the composite score of MMST are presented in the table below.

Table 46. Inter-rater reliability of MMST

Categories	K	P value
Cognitive terms	.807	.000
Desire terms	.829	.000
Emotion terms	.518	.000
General terms	.789	.000
Assertion of modulation terms	.640	.004
Total MMST	.525	.000

Table 46 presents inter-rater reliabilities of MMST calculated using Cohen's Kappa. The inter-rater reliabilities for different categories ranged from .518 to .829. It is notable that the k value for emotion terms was lower than other categories although it still indicated a moderate reliability. One reason for this could possibly be the frequency with which emotion terms were used. References to emotion were most frequently used mental state terms with a range of 2-55 (M= 19.47, SD= 11.50) whereas all the other categories had a range of 0-10 or less. It is possible that coders might have missed or miscalculated the number of emotion utterances in some cases. And the low k value on emotion category also accounts for the low value of total MMST. However, all the values were still in acceptable range.

5.5.8 Materials

For the ToM assessment a variety of picture cards, toy characters and other objects (such as boxes) were used (for details of the materials are given in previous chapter). For the executive functioning tasks different cards with pictures and a peg was used. Three pictorial story books and an audio recorder was used for MMST. Response record forms were used to record the responses of participants on different tasks (see Appendix B).

5.5.9 Procedure

An ethical approval (E367) for conducting this study was provided by the Chair of the Humanities, Social and Health Sciences Research Ethics Panel at the University of Bradford. Invitation letters to take part in the study were sent to 400 parents via respective class teachers in the selected schools. Initially 133 parents provided consent to take part in the study however, only 65 mothers agreed to visit school when contacted later. Mothers were contacted through teachers to schedule a 1.5 hours visit to school. Two sessions were conducted with mothers with a gap of 15-20 minutes. In the first session mothers filled in a demographic sheet and PDSQ. On average the first session lasted for 30-40 minutes. Mothers were also given a form of PDSQ to be filled in by fathers and returned to schools later. However, very few forms were returned and therefore the father's parenting styles were not included in the analysis. In the second session mothers were provided three pictorial story books and were told to tell their child the story from the books as they would normally do at home. Mothers were allowed to use any language they were comfortable in. All the mothers read stories in Urdu language, however, words in English were used frequently. Some mothers showed reluctance and stated they had never done such an activity before and were not sure of what to do. In such cases the researcher assured the mothers that there was no right or wrong way of doing this activity. And they could just consider it an opportunity to tell their child some stories. On average the story session lasted from 10 to 17 minutes. The story session was recorded with an audio-recorder.

A separate session was conducted with children to test ToM and EF. Each child was tested individually in the activity room of the school. It took about 10-15 minutes on average to complete five ToM and 3 EF tasks. The presentation of the ToM and EF tasks was counterbalanced. The procedure used for administering ToM and EF tasks was the same as used in the cross-cultural study (chapter 4). Teachers were provided MASCS to fill in for each student.

5.6 Results

The current study was conducted to investigate the links between parenting styles, maternal mental state talk and ToM among Pakistani children. A further aim of the study was to test how parenting styles or maternal mental state talk relate to social competence of children. Maternal mental state talk (MMST) was measured during a story telling session where mothers described three pictorial books to their child. Mothers also provided a measure of parenting styles by filling in a translated version of PSDQ. Children were tested for ToM and EF in a separate session and ratings for social competence were obtained from respective teachers on MASCS for each participant.

5.6.1 Scoring

ToM tasks were scored as 1 for correct answer and 0 for incorrect answer. An aggregate score for ToM scale was computed by adding scores on the 5 ToM tasks. The total score for ToM scale (computed by adding the scores on 5 tasks) ranged from 0-5. EF tasks were also scored as 1 for correct response and 0 for incorrect response. The aggregate score for Peg Tapping and Day/Night task was calculated by adding the scores on 12 trials and ranged from 0-12. The total score for DCC task was a sum of obtained scores on 16 trials and ranged from 0-16. An aggregate score for EF was computed by adding the total scores of the three tasks and it ranged from 0-40.

For MASCS a score of 1-4 was given for each statement where 1 is for never (exhibit that behavior) and 4 is for frequently (exhibit that behavior). A total score was calculated for pro-social and antisocial dimensions separately. The pro-social subscale included the factors of cooperative skills (5 items) and empathy (3 items) and the aggregate score for this subscale ranged from 8-32. The antisocial subscale comprised of Impulsivity (3 items) and disruptiveness (4 items) factors. The composite score for antisocial subscale ranged from 7-28. The higher scores on pro-social subscale indicate more frequent pro-social behaviours, whereas high scores on antisocial subscale indicate high occurrence of antisocial behaviors.

The PSDQ has 3 subscales (authoritarian, authoritative and permissive parenting), and the items are rated on a 5-point Likert scale, where 1 stands for ‘never exhibit this behaviour ‘and 5 stands for ‘always exhibit this behaviour’. The scores for the subscales were calculated by summing up all the item scores and dividing by total number of items in the respective subscale. For MMST raw scores (number of utterances) were used in each category and a total MMST score was calculated by adding up the scores of all categories.

The results of the study are presented under three subsections. Firstly, under the subsection of main demographics, the information related to participants age, gender, number of siblings, parental education and family type is presented. In the second subsection preliminary analysis of the five variables in terms of means, standard deviations and ranges is presented. The last subsection deals with relationships between the three variables and includes correlations and regression analysis.

5.6.2 Main Demographics

This section presents demographic variables for the entire sample. It includes information about age, gender, number of siblings and family structure of the participants. Furthermore, the information about parental education is also included in this section.

Table 47. Age and gender of Participants

	Age (in years)			Gender		Nursery	
	Mean	S.D	Range	F	M	No	Yes
Total Sample (N=63)	5.00	.99	3.08-7.00	28 (44%)	35 (56%)	51 (81%)	12 (19%)

Table 47 reports the demographic characteristics (age and gender) of participants in the current study. The mean age of participants was 5.00 and 44% were females. In addition the table also indicates whether the participants had attended

nursery/day-care before starting the school. Most of the participants (81%) had not attended any day-care and stayed at homes before starting school.

Table 48. Family structure and total number of siblings

	Family structure			Number of siblings				
	Nuclear	Joint	Extended	0	1	2	3	4
Total Sample (N=63)	12 (19%)	48 (76%)	3 (5%)	3 (5%)	24 (38%)	23 (36.5%)	11 (17.5%)	2 (3%)

Table 48 indicates the family structure or system the participants were living in. A joint family was defined as living with grandparents, aunts, and uncles under one roof. Whereas a nuclear family was defined as only parents and their children living together. An extended family was where the family unit was nuclear (only parents and children living together) but they lived in close proximity and were in frequent contact with other relatives such as grandparents, uncles, aunts, and cousins. Frequent contact in this regard was defined as regular visits to the relatives (at least once every week). As indicated in the table 48, majority of the participants (78%) lived in a joint family system, followed by nuclear (19%), and extended (5%) family systems. The table also presents the number of siblings for the participants. Most of the participants had either 1 (38%) or 2 (36.5%) siblings.

Table 49. Parental education level and ethnicity (N=63)

	Education			Ethnicity			
	HSSC or less	Bachelors	Postgrad	Punjabi	Urdu	Kashmiri	Others
Mother	8 (12%)	21 (34%)	34 (54%)	42 (67%)	9 (15%)	4 (6%)	8 (12%)
Father	4 (6%)	27 (43%)	32 (51%)	52 (83%)	5 (8%)	4 (6%)	2 (3%)

Table 49 presents academic qualification of both parents and their ethnic background. Most of the mothers as well as fathers had a postgraduate qualification (16 years or more) followed by a bachelors or undergraduate degree (14 years of education). With reference to ethnicity majority of the participants (83%) belonged to Punjabi ethnic group.

5.6.3 Preliminary Analysis

This section includes descriptive analysis of ToM scale, EF tasks, MASCS, PSDQ and MMST. In addition the section also includes a one-way analysis of variance (ANOVA) for measuring differences in age groups. For preliminary analysis participants were divided in three age groups. Participants between the ages of 3.08 to 4.11 were considered 4 years old. Those between the ages of 5.00-5.11 were categorized as 5 years old and those between the ages of 6.00-7.00 were considered 6 years old.

Table 50. Distribution of total ToM score for the three age groups

	0	1	2	3	4	5
4 year olds (N=23)	2 (9%)	8 (35%)	4 (17%)	8 (35%)	-	1 (4%)
5 year olds (N=20)	-	1 (5%)	6 (30%)	8 (40%)	5 (25%)	-
6 year olds (N=20)	-	-	-	10 (50%)	6 (30%)	4 (20%)
Total (N=63)	2 (3%)	9 (14%)	10 (16%)	26 (41%)	11 (18%)	5 (8%)

Table 50 presents the distribution of scores on five ToM tasks. The composite score for five ToM tasks ranged from 0 (failed all tasks) to 5 (passed all tasks). Majority of 4-year-olds passed either one (35%) or three (35%) tasks and only one participant was able to pass all 5 tasks. Most of the 5-year-olds passed 3 tasks (40%) and a few (25%) were able to get 4 tasks correct. Half of the 6-year-olds got three tasks correct whereas 30% passed 4 tasks and 20% were able to give correct answers to all the tasks. When analysis was done for all the participants together, a gradual increase on the scores (from 0 to 3) could be seen. Very few

participants scored 0 with an increased number scoring 1 and 2 and the vast majority (41%) scoring three. Number of participants with a score of 4 declined and a very few participants were able to score 5.

Table 51. Mean and SD on individual ToM tasks and Total score

	DD	DB	KA	FB	HE	TOTAL ToM
4 year olds (N=23)	.80 (.38)	.39 (.49)	.52 (.51)	.09 (.28)	.13 (.34)	1.91 (1.20)
5 year olds (N=20)	.85 (.36)	.55 (.51)	.80 (.30)	.25 (.22)	.45 (.51)	2.80 (.95)
6 year olds (N=20)	1 (.00)	.55 (.51)	.90 (.30)	.55 (.48)	.60 (.50)	3.70 (.80)
Total (N=63)	.89 (.31)	.49 (.50)	.76 (.42)	.25 (.43)	.40 (.49)	2.79 (1.24)

SD in parenthesis, DD=diverse desire, DB=Diverse belief, KA=knowledge access, FB=false belief, HE=hidden emotion

Table 51 presents mean scores on the five tasks of ToM scale and its aggregate score for different age groups. The mean scores on individual ToM tasks indicated that all three age groups scored highest on desire task followed by the knowledge access task. On the rest of the tasks, 4 and 5-year-olds performed higher on diverse belief followed by hidden emotion and false belief tasks respectively. However, the 6-year-olds performed higher on hidden emotion followed by an almost equal performance on diverse belief and false belief.

Table 52. Mean and SD on individual EF tasks and Total score

		Day/night Stroop	Peg-tapping	DCCS	Total EF
4 year olds (N=23)	Mean	6.35	9.04	15.20	30.60
	SD	(3.32)	(3.00)	(1.72)	(6.18)
5 year olds (N=20)	Mean	8.30	11	15.48	34.78
	SD	(3.71)	(1.52)	(2.16)	(5.25)
6 year olds (N=20)	Mean	9.90	11.10	15.48	36.48
	SD	(2.38)	(1.44)	(1.96)	(4.11)
Total (N=63)	Mean	8.10	10.32	15.30	33.71
	SD	(3.47)	(2.34)	(1.92)	(5.69)

Table 52 presents the descriptive statistics for the individual EF tasks as well as the composite score of EF. The mean scores on individual tasks as well as the total of EF are increasing with age. Four year olds had the lowest mean scores on all tasks and 6-year-olds had the highest mean scores on each task as well as the total of EF tasks.

Table 53. Mean SD and range of MASCS subscales

	Pro-social		Antisocial	
	Mean	Range	Mean	Range
4 year olds (N=23)	24.83 (3.95)	16-29	10.70 (3.47)	7-18
5 year olds (N=20)	25.15 (3.18)	19-30	9.45 (3.70)	6-19
6 year olds (N=20)	24.75 (3.52)	18-29	11.20 (2.50)	7-15
Total (N=63)	24.90 (3.54)	16-30	10.46 (3.30)	6-19

SD in parenthesis

Table 53 presents the descriptive statistics for the subscales of MASCS for different age groups. Five year olds had the highest mean score on pro-social subscale whereas 6-year-olds had the highest mean score on antisocial subscale of MASCS.

Table 54. Mean and SD of PSDQ subscales

	Mean	
Authoritarian	2.52	(.66)
Authoritative	3.94	(.60)
Permissive	2.29	(.37)

SD in parenthesis

The mean of authoritative parenting style was highest (see table 54). This indicated that most of the parents reported using more authoritative parenting strategies. This was followed by authoritarian and permissive parenting styles respectively.

Table 55. Mean, SD and range of sub-categories and total of MMST

	Mean	Range
MMST Total	19.47 (11.50)	2-55
Cognitive	1.28 (1.70)	0-6
Desire	1.55 (1.72)	0-7
Emotion	14.28 (8.96)	2-47
General	1.96 (2.34)	0-10
Modulation of Assertion	.38 (.86)	0-5

SD in parenthesis

Table 55 presents the mean, SD and range of references made to mental states in the story telling sessions. Total mental state utterances ranged between 2 to 55 (M=19.47, SD=11.50). References to the emotion mental states were highest in frequency followed by references to general mental states, desire, cognitive and modulation of assertion.

Table 56. ANOVA for Age differences in ToM and EF

	4 year olds (N=23)	5 year olds (N=20)	6 year olds (N=20)	F	P
	M	M	M		
ToM	1.96 (1.22)	2.85 (.875)	3.70 (.801)	16.38	.000
EF	30.60 (6.18)	34.78 (5.25)	36.48 (4.11)	5.72	.005

SD in parenthesis

To investigate whether there was a significant difference in performance of age groups on tasks of ToM and EF, a one-way between subjects analysis of variance was conducted (see table 56). There was a significant effect of age on

performance on ToM scale for the three age groups: F (2, 60) = 16.38, p<0.000. Post-hoc comparisons using the Bonferroni test indicated that the mean score of 4-year-olds (M=1.96, SD=1.22) was significantly lower than that of 5-year-olds (M=2.85, SD=.87; p=0.014) and 6-year-olds (M=3.70, SD=.80; p<0.001). This indicated that the younger participants performed worse than both the older groups. Furthermore, the 6-year-olds performed significantly better than the 5-year-olds (p=0.027).

There was a significant effect of age on performance on EF tasks for the three age groups: F (2, 60) = 5.72, p<0.01. Post-hoc comparisons using the Bonferroni test indicated that the performance of the 4-year-olds (M=30, SD=6.18) was significantly lower than the performance of 5-year-olds (M=34, SD=5.25; p=0.024) as well as 6-year-olds (M=36, SD=4.11; p=0.005). There was no significant difference in the performance of 5 and 6-year-old participants.

5.6.4 Main Analysis

This section includes the results of partial correlations between the variables. It also includes a hierarchical multiple regression to determine the predictors of ToM in young Pakistani children.

Table 57. Partial Correlation between the ToM, EF and social competence after controlling for age (N=63)

	EF	Pro-social	Anti-social	Authoritarian	Authoritative	Permissive
ToM	.328**	.376**	-.282*	-.509***	.433***	-.172
EF	-	.199	-.147	-.332**	.114	.339**
Pro-social			-.348**	-.251*	.172	.025
Antisocial				.303*	.195	-.011

*Correlation is significant at p<0.05, **Correlation is significant at p<0.01, ***Correlation is significant at p<0.001

Table 57 presents the results of Partial correlation between ToM, EF, subscales of MASCS and parenting styles after controlling for the effect of age. The scores on ToM showed a significant positive correlation with EF (*r*=.328, *p*=.009), pro-social behaviours (*r*=.376, *p*=.003) and authoritative parenting style (*r*=.433, *p*=.000). On the other hand, ToM negatively correlated with antisocial behaviours (*r*=-.282, *p*=.026) and authoritarian parenting style (*r*=-.509, *p*=.000). Scores on EF had a significant negative correlation with authoritarian parenting style (*r*=-.332, *p*=.008) whereas a positive correlation with permissive parenting style (*r*=.339, *p*=.007). Authoritarian parenting style also had a significant negative correlation with pro-social behaviours (*r*=-.251, *p*=.039) and a positive correlation with antisocial behaviours (*r*=.303, *p*=.017).

Table 58. Partial correlation between MMST and its sub-categories and ToM tasks after controlling for age (N=63)

	MMST	Cognitive	Desire	Emotion	General	MoA
ToM Total	.463***	.140	.212	.422**	.237	.413**
DD	.087	.031	.277*	.016	.121	.113
DB	.317*	.230	.058	.263*	.243	.238
KA	.143	.023	.046	.111	.170	.134
FB	.273*	.115	.121	.297*	.117	.225
HE	.216	.136	.055	.244	.092	.228

*Correlation is significant at p<0.05, **Correlation is significant at p<0.01, ***Correlation is significant at p<0.001

DD=diverse desire, DB=Diverse belief, KA=knowledge access, FB=false belief, HE=hidden emotion, MMST=maternal mental state talk, MOA=modulation of assertion

Table 58 shows the results of partial correlation between ToM (individual tasks and total score) and MMST (individual categories and total score) after controlling for the effect of age. Total score on ToM tasks showed a significant positive correlation between total score of MMST(*r*=.463, *p*=.000) and the categories of emotion (*r*=.422, *p*=.001) and modulation of assertion (*r*=.413, *p*=.001). The total score of MMST significantly correlated with diverse belief (*r*=.317, *p*=.012) and false belief (*r*=.273, *p*=.032) tasks of ToM. Some individual tasks of ToM also appeared to correlate with individual categories of MMST. The scores on diverse desire task of ToM had a significant positive correlation with references to desire

(*r*=.277, *p*=.029) mental states. The emotion utterances had a significant relation with diverse belief (*r*=.263, *p*=.039) and false belief (*r*=.297, *p*=.019) tasks.

5.6.5 Hierarchical Multiple Regression

A hierarchical multiple regression was carried out to assess the significant predictors of ToM and to determine the amount of variance explained by each of these predictor variables. Keeping in view the previous theoretical and research evidence the sociodemographic variables were entered in the regression model in first block (Williams et al. 2007). In the second block EF was entered based on previous research evidence (Devine and Hughes 2014). MMST was entered in third block and parenting style was entered in fourth block.

The analysis revealed that there was independence of residuals, as indicated by a Durbin-Watson statistic of 1.75 (Field 2009). The analysis also showed that all the Tolerance values were greater than 0.1 (lowest was 0.78), and VIF values were less than 10 (highest was 1.26) indicating that there was no issue of collinearity among the variables (see Appendix C).

Table 59. Hierarchal multiple regression analysis of ToM (N=63)

Variables	*R*	R^2	R^2 *Change*	*B*	*SE*	*β*	*t*	*Sig(p)*
Step One	**0.63**	**0.34*** **						**<0.001**
Age				0.78	0.12	0.62	6.28	<0.001
Step Two	**0.69**	**0.47** **	**0.08** **					**<0.001**
Age				0.63	0.12	0.50	5.01	<0.001
EF				0.06	0.02	0.31	3.02	0.004
Step Three	**0.78**	**0.60*** **	**0.13*** **					**<0.001**
Age				0.52	0.11	0.42	4.59	<0.001
EF				0.06	0.01	0.30	3.48	0.001
MMST				0.04	0.01	0.37	4.42	<0.001
Step Four	**0.80**	**0.64***	**0.04***					**<0.001**
Age				0.56	0.11	0.45	5.15	<0.001
EF				0.06	0.02	0.28	3.34	0.001
MMST				0.04	0.01	0.34	4.18	<0.001
AUT				0.41	0.16	0.20	2.56	0.013

EF=executive functions, MMST=maternal mental state talk, AUT=authoritative parenting styles
R^2 = amount of variance explained by IVs ; R^2 Change = additional variance in DV ; B = Unstandardized coefficient ; β = Standardized coefficient ;SE= Standard Error t = estimated coefficient

Table 59 presents the results of Hierarchical Multiple Regression analysis of ToM. In the first step of analysis age was entered as predictive variable, which accounted for 34 % (F (1, 61) = 39.49; p<0.001) of the variance in ToM. In the second step EF was entered as a predictive variable and the total variance

explained by the model as a whole was 47% (F (2, 60) =26.95; p<0.001). The introduction of EF explained additional 8% of variance in ToM, after controlling for age (R^2 Change = .08; F (1, 60) = 39.48; p =0.004). After entry of MMST at Step 3 the total variance explained by the model as a whole was 60% (F (3, 59) = 30.02; p < 0.001). The introduction of MMST explained additional 13% of variance in ToM, after controlling for age and EF, (R^2 Change = .13; F (1, 59) = 19.51; p < 0.001). In the final step authoritative parenting style was entered and the total variance explained by the model as a whole was 64% (F (4, 58) = 26.26; p < 0.001). The introduction of parenting style explained additional 4% of variance in ToM, after controlling for age, EF and MMST (R^2 Change = .04; F (1, 58) = 6.54; p =0.013). In the final model age (β = 0.45, < 0.001) was identified as the most significant predictor, followed by MMST (β = 0.34, p< 0.001), EF (β = 0.28, p= 0.001) and parenting style (β = 0.20, p= 0.013) respectively.

A simple linear regression analysis was carried out to assess whether ToM significantly predicts variance in MMST.

Table 60. Simple regression analysis of MMST (N=63)

Variables	*R*	*R^2*	*B*	*SE*	*β*	*t*	*Sig(p)*
ToM	.50	0.25	4.72	1.04	0.50	4.52	<0.001

R^2 = amount of variance explained by IV; B = Unstandardized coefficient ; β = Standardized coefficient ;SE= Standard Error t = estimated coefficient

A simple linear regression was calculated to predict MMST based on ToM scores (see table 60). A significant regression equation was found (F (1, 61) = 20.46; p< 0.001), with an R^2 0f 0.25. This indicated that ToM scores explained 25% variance in MMST.

5.7 Discussion

The current research was carried out to investigate how various parental factors such as parenting styles and maternal mental state talk relate to mental state understanding of Pakistani children. In addition the study also tested how these factors relate to children's EF and social competence. Data was collected from 63 children (44% females) between the ages of 4-7 years (M=5, SD=.99) and their mothers. Participants were tested on 5 ToM tasks and 3 EF tasks and ratings for social competence were provided by their respective teachers on MASCS. Mothers were invited to schools where they engaged in a story telling session with their child. Mothers' discourse during story teling activity was audio recorded and later coded for maternal mental state talk. Mothers also filled in a questionnaire for measuring parenting styles. The majority of mothers had an education of postgraduate level and belonged to Punjabi ethnicity. The majority of the participants had either 1 (38%) or 2 (36.5%) siblings and had not been admitted to a day care/nursery (81%) before starting the school. A similar trend was observed in the previous cross cultural study where about 89% parents reported that their children did not go to any nursery or day care before starting the school. Almost 76% participants belonged to a joint family system and 19% reported living in a nuclear family.

5.7.1 Findings of Preliminary Analysis

The findings of preliminary analysis were consistent with most of the results from the previous study (chapter 4). Mean scores on Individual ToM tasks presented similar pattern of passing a task as observed in Pakistani children in the previous cross-cultural study. The highest mean score was on desire task for participants in all age groups indicating an advanced understanding of desire. This finding is also in line with the existing literature, which suggests that children acquire understanding of desire before other mental states (Wellman and Liu 2004). Followed by desire was the understanding of knowledge access, diverse beliefs, hidden emotions and false belief respectively. It has been suggested that children from collectivist cultures acquire understanding of knowledge access prior

to diverse beliefs compared to children from individualist cultures who master these mental states in reverse order (Wellman et al. 2006; Shehaien et al. 2011). The current findings provided some support for this view. The mean score on knowledge access is higher than diverse belief indicating a better understanding of how knowledge is acquired than that people can have different beliefs. The Pakistani society's focus on gaining factual knowledge and a strong emphasis on accepting opinion of elders may explain why children might find it hard to appreciate diversity in opinion and exhibit a greater understanding of sources of knowledge. Furthermore Wellman and Liu (2004) proposed that after desire, diverse belief and knowledge access Western children develop an understanding of false belief followed by hidden emotions. Pakistani children however, scored higher on the measure of hidden emotions than false belief and this trend was also observed in the previous cross-cultural study conducted as part of the same PhD. It seems as though the sequence in which Pakistani children acquire an understanding of mind may vary from that reported for Western children. However, this impression is only based on the mean scores for ToM tasks and no specific analysis was conducted for this purpose. A number of factors could account for this variation. As mentioned earlier social factors such as parenting styles (Vinden 2001) and the content of parent-child conversations (Doan and Wang 2010) varies in different cultures and has been associated with ToM development (Ruffman et al. 2002; Pears and Moses 2003). There is a possibility that a combination of these and other social factors might have different effects on ToM acquisition in Pakistani children than those reported for children from individualist cultures. However, further investigation is required regarding the sequence of mental state acquisition and its determinants. In addition, as per the expectation, age had a significant effect on performance of children on both ToM and EF tasks. There were significant differences in the performance of participants in different age groups with younger participants performing worse than the older ones.

With reference to parenting styles, the mean score for authoritative parenting was highest followed by authoritarian and permissive parenting respectively. Although previous research specifies that Asian parents practice

more authoritarian parenting (Dornbusch et al. 1987; Leung et al. 1998; Vinden 2001) the results of the current research indicates otherwise. One reason for this finding could be that the mothers included in the current sample were all educated with majority having at least 14 years of education. Kashahu et al. (2014) conducted a study to investigate the links between parenting styles and parental demographics and found that authoritative parenting style was associated with higher levels of education. In addition socioeconomic status has also been associated with parenting styles (Shumow et al. 1998), specifically authoritarian parenting style is linked with low socio-economic status (McLoyd 1990; Shumow et al. 1998). Although data on socio-economic status of the current sample was not obtained, the schools contacted were private and catered to the middle economic class. Based on this, it can be assumed that the majority of the parents belonged to the middle socioeconomic class, and this could explain why the dominant parenting style was authoritative.

The range of a composite score for MMST was 0-55 (M=19.47, SD=11.50). There was a great variation in how frequently individual mothers used mental state terms, with one mother using only 2 terms and another using 55 mental state terms. In the current sample the most frequently used mental state terms were related to emotion (M=14.28, SD=8.96) followed by general mental state, desire, cognitive and modulation of assertion. This contrasts with Ruffman et al. (2002) who reported most frequent references made to think and know terms followed by desire terms. This could either be due to a genuine trend among Pakistani mothers to refer more to emotions than other mental states, or a methodological issue. As a genuine trend it can possibly be an indication that Pakistani mothers focus more on emotional mental states than cognitive mental states during conversation with the child. It has been argued that a mother's attitude or beliefs about her child will guide her behaviours during interactions with her child (Meins et al. 2002, de Rosnay and Hughes 2006). Thus the mother's perception of her child as an independent, thinking and feeling being (or otherwise) will reflect in her interactions (de Rosnay and Hughes 2006). It is likely that mothers who perceive their children as dependent and not as an autonomous thinking being would use less cognitive

state terms in their conversation with the child. Cultural variations in content of maternal talk with children have been reported in previous studies as well. For example, Tardif et al. (1997) reported that Italian mothers talked less to their children and asked more test questions compared to British mothers who asked more genuine questions such as ‘what would you like to do’. This tendency to ask genuine questions indicates that British mothers show an inclination to treat their children as thinking individuals (Hughes et al. 2014). Pakistani mothers’ propensity to use less think and know mental state terms could possibly reflected a general attitude to consider children as dependent and reliant on adults rather than an autonomous agent. It could also indicate that mothers do not focus much on promoting independent thinking in their children and this could be a result of their own upbringing.

A methodological issue in this regard could be the stimuli provided for this activity (i.e. the pictorial story books). There is a possibility that the books offered more opportunities to refer to emotional mental states than any other. It is also possible that the emotional mental states were more obvious than other mental states. For example it is easier to infer that a character is happy sad or angry from the facial expressions then it is to infer beliefs and desires. However, care should be given in selecting such stimuli in future research to avoid the possibility of certain mental states being represented more than others.

5.7.2 Main Findings

The following section includes the discussion on associations of parenting styles and maternal mental state talk with ToM ability of young Pakistani children.

5.7.2.1 Parenting styles

The first aim of the study was to investigate the links between parenting styles and ToM. In this regard it was of interest to test whether the links reported between these two variables in Western society also remain consistent in Pakistani society. With reference to parenting styles it appears that there are more similarities than differences in Western and Pakistani culture. The current findings of an association between ToM and parenting styles replicated the results of

O'Reilly and Peterson (2014). The results indicated a positive relationship between ToM and authoritative parenting and a negative link of ToM with authoritarian parenting. In other words, the parents who were high on responsiveness as well as control dimension had children who performed better on ToM tasks. Compared to authoritative parents, children of authoritarian parents who were low on responsiveness but high on control dimension, performed lower on ToM tasks. The characteristics associated with authoritative parenting such as open communication, verbal give and take, warmth and encouragement, can possibly account for the positive link found between ToM and authoritative parenting style in the current study. An open communication strategy allows children to express their opinions and encourages them to listen to the perspective of others as well. Exposure to differences in opinions and perspectives can presumably promote an understanding that people can have different desires and beliefs. On the other hand high levels of control and lack of open communication in authoritarian parenting practices might be accountable for low ToM understanding in children. It is notable here that although both authoritative as well as authoritarian parents are high on control dimensions but the strategies they use for exerting control are different. Authoritarian parents use more punitive strategies and do not offer reasons for the rules. In addition, authoritarian parents do not engage in verbal give and take and do not allow children an opportunity to express their opinions. Authoritative parents on the other hand use reasoning to enforce rules and avoid strict punitive strategies. They use open communication strategies and foster independence and autonomy. These differences in the strategies used by authoritative and authoritarian parents could explain the variations in the performance of their children on ToM tasks. Hughes et al. (1999) found that mental understanding related positively with parental warmth and negatively correlated with measures of parental negative control. Furthermore, Pears and Moses (2003) also found a negative association between power assertive discipline techniques (such as yelling and spanking) and belief understanding even after controlling for the effect of age, cognitive ability, and demographics. Thus, it appears that the characteristics associated with authoritative parenting (warmth, open

communication, reason based discipline etc.) are more advantageous for developing an understanding of mental states. In addition, the finding that authoritative parenting style is positively associated with ToM is in line with the previous findings from Western individualist societies (O'Reilly and Peterson 2014). This provided some support for the universality of the link between parenting styles and mental state understanding. Authoritative parenting style also appeared to be a significant predictor of ToM in the current sample.

Another finding of the current study in relation to parenting styles was a significant negative association of authoritarian parenting style with EF. This indicated that the children of parents, who use punitive control and exhibit low levels of responsiveness, scored low on measures of EF. One possible explanation for this negative association could be that high parental control deprives children of opportunities to make their own choices, which may include the decision to inhibit or express certain behaviours on particular occasions. This may lead to fewer chances to practice their EF skills thus making children dependent on parental instructions. On the other hand, permissive parenting style had a positive association with EF, which indicated that the parents who were low on control as well as responsiveness had children who scored higher on EF tasks. A possible explanation for this association could be that permissive parents give a free hand to their children in terms of making choices and decisions. This might allow children greater autonomy and opportunities to practice their EF skills. However, this finding must be interpreted with great caution since the reliability of the permissive subscale of PSDQ was reported to be low in Asian cultures (Olivari et al. 2013), as well as in the current study. It is possible that the items on permissive subscale do not actually measure permissive parenting style for Pakistani parents.

The results of the current study also revealed that authoritarian parenting style had a negative association with pro-social behaviours and a positive association with antisocial behaviours. This indicated that children whose parents used strict control strategies and exhibited less warmth and responsiveness scored low on empathy and pro-social skills but high on disruptiveness and impulsivity. These results are in line with the findings of previous studies that investigated

associations between parenting styles and socio-emotional adjustment and behavioural problems of Pakistani adolescents. It has been reported that authoritarian parenting style was positively associated with several problematic behaviours (Rizvi and Najam 2015) including externalizing (such as conduct problems) as well as internalizing problems (such as anxiety and depression) (Akhtar et al. 2011) and negatively associated with overall socio-emotional adjustment of Pakistani adolescents (Kausar and Shafique 2008). Authoritative parenting style on the other hand had been associated with social acceptability, sharing with others, overall socio-emotional adjustment and negatively associated with several problematic behaviours (Kausar and Shafique 2008; Akhtar et al. 2011; Rizvi and Najam 2015). However, most of the previous studies with a Pakistani sample included either adolescents (Kausar and Shafique 2008; Rizvi and Najam 2015) or children over 8 years of age (Akhtar et al. 2011). The current study has extended this association in a younger age group of 4 to 7 years. The findings here suggested that authoritative parenting strategies yield their beneficial effects from a very young age, and that this association was not affected by variations in cultural values.

5.7.2.2 Maternal Mental State Talk

Another aim of the study was to investigate the links between maternal mental state talk (MMST) and ToM. The current study was the first to explore this link in a Pakistani population and variations in frequency of mental state references were expected. The categories of maternal mental state talk appeared to have several significant relationships with scores on ToM tasks. First of all the total score of ToM was significantly positively related to total score of MMST as well as the categories of modulation of assertion and emotion utterances. These findings are consistent with Ruffman et al. (2002) who found a link between ToM scores and modulation of assertion. They suggested that modulations of assertion make specific references to uncertainty and are therefore expected to be a correlate of ToM. In the current sample although the frequency of these terms was low when compared to other categories (M=.38, SD=.86, range=0-5), they still appeared to be a strong correlate of mental state understanding. Maternal references to mental

states of emotions also had a significant relationship with the child's ability to understand mental states. It is notable here that emotion references were the most frequently used mental state words in the current sample. This could be a possible explanation for the relatively higher performance of Pakistani children on hidden emotion task of ToM scale. However, the relation between hidden emotion task and the references to emotion terms did not reach a significance level. There is a possibility that plain references to emotion states might not be enough to develop an understanding of emotions rather something more is required. Peskin and Astington (2004) found that exposing children to metacognitive vocabulary resulted in increased production of metacognitive language but not in comprehension. There is a possibility that children, who are exposed to high frequency of references to emotional mental states, might start using more emotion terms without actually developing an understanding of these terms. Furthermore, Denham et al. (1994) found that mothers' explanations of emotions predicted children's emotion understanding rather than the number of references to emotions. Another possibility is that the references to overall mental state terms contribute more to acquiring an understanding of hidden emotion rather than just references to emotions. In addition the emotions category had a significant relationship with diverse belief and false belief tasks and the references to desire had a positive link with the scores on desire task. However, as Ruffman et al. (2002) indicated, it appears that references to various mental states i.e. the composite score of MMST rather than any single category is a more fitting correlate of ToM.

MMST was also found to be a significant predictor of ToM along with age, EF and parenting style. The findings indicated that age explained the most variance in ToM followed by MMST, EF and authoritative parenting style respectively. MMST appeared to be a stronger predictor of ToM than both EF and parenting styles. The current findings are consistent with the previous literature, which indicates that maternal references to mental states can predict ToM development in children (Ruffman et al. 2002; Ruffman et al. 2006; Taumoepeau and Ruffman 2006). It seems that exposure to mental state terms during

conversations in early childhood allows children to acquire a better understanding of others' mental states. Maternal references to mental states of the child or others appear to facilitate the development of representational understanding of mental states in children. Specifically, the strong predictive link between MMST and ToM in Pakistani population could also explain the lag found in ToM acquisition of Pakistani children in the earlier three studies of this thesis.

In addition it is also evident that children with advanced ToM elicit more references to mental state talk from their mothers. The findings of the current study indicated that ToM scores accounted for 25% variance in maternal mental state talk. This is in support of the previous studies that suggest that the children with higher ToM ability elicit more mental state talk from their mothers. There is a possibility that the mothers tend to use more mental state terms because their children exhibit a better understanding of mental states. However, it seems that the link between ToM and MMST is bidirectional in that both influence each other. In sum, the findings of the present study highlighted the important role of parental involvement and the content of parent child conversation in early childhood.

5.8 Chapter Summary

The chapter discussed the role of parental factors in the development of ToM, EF and social competence. In particular two parental factors, parenting styles and maternal mental state talk were investigated in association with ToM, EF and social competence. Previous research indicates that authoritative parenting style was associated with positive child outcomes (including ToM, EF and social competence) and authoritarian parenting style was associated with negative child outcomes (Maccoby and Martin 1983; Lamborn et al. 1991; Chen et al. 1997; Milevsky et al. 2007; Bernier et al. 2010; O'Reilly and Peterson 2014). Likewise maternal mental state talk has also been associated with children's ToM development (Ruffman et al. 2002; Adrian et al. 2007). Empirical findings also indicate that cultural variations exist in parenting styles and the frequency and content of MMST (Vinden 2001; Doan and Wang 2010). Based on these suggestions a research study was designed to investigate the links between parental factors (parenting style and MMST) and TOM, EF and social competence

in a sample from Pakistan. Sixty-three children were tested on measures of ToM and EF and teachers provided ratings for social competence. Mothers of participants were invited to school for a story telling session with their child which was audio recorded and later coded for mental state references. In addition, mothers also filled in a measure of parenting styles. The findings of the study indicated a significant positive link between authoritative parenting style and ToM after controlling for the effect of age. On the contrary authoritarian parenting had a significant negative association with ToM, EF and pro-social behaviours and a positive association with antisocial behaviours. MMST was positively associated with the ability to understand mental states. Furthermore, the results of hierarchical regression analysis indicated that age, EF, MMST and parenting styles were significant predictors of ToM scores.

Chapter 6

Discussion and Conclusion

6.1 Introduction

Theory of Mind (ToM), the cognitive ability to attribute mental states to self and others (Doherty 2009), has been a prominent area of investigation in developmental Psychology for over three decades now. Recently, the focus of research on ToM has shifted toward a social constructivist perspective, which claims that, the cultural and social experiences of children shape their understanding of mental states (Carpendale and Lewis 2004). In accordance with this perspective, variations have been found in the performance of children from diverse cultures on false belief and other measures of ToM. These variations have been reported in East vs. West as well as within the Eastern and Western cultures. Some cultural variations have been attributed to a general broader cultural influence of collectivist and individualistic societies (Liu et al. 2008; Shahaeian et al. 2011). In addition, others have attributed cultural dissimilarities to differences in specific organized activities (such as education) between various cultures. A 'pedagogical hypothesis' claims that the age of entering the school and pedagogical strategies used in various educational systems could explain the cultural differences in mental state understanding (Lecce and Hughes 2010).

Majority of the studies that compared ToM in Collectivist vs. Individualist cultures were conducted in the collectivist societies of China/Japan (Naito and Koyama 2006; Liu et al. 2008; Wang et al. 2016). However, there is little research on mental state understanding in other collectivist cultures. The aim of the research included within this thesis was to investigate the development of ToM in children from the collectivist society of Pakistan, where the ToM research is almost non-existent. Although, Pakistan shares some aspects of collectivism with Chinese/Japanese societies, there exist many disparities in various aspects of everyday life (social, religious, academic and economic). In addition the current

research is novel in that it not only compared the performance of children from collectivist and individualist cultures but also included a scenario where a collectivist culture has been embedded in an individualist society (i.e. British Pakistani diaspora). This unique situation provided the opportunity to investigate the influence of both collectivist and individualist cultures on the development of mental state understanding. The current thesis also tested the 'pedagogical hypothesis' by comparing the performance of children from a Western and Eastern educational system. In addition, the thesis aimed to investigate the universality of links between ToM, executive functioning (EF) and social competence. Finally, the association between parental factors (parenting styles and maternal mental state talk) and ToM in a collectivist culture was also explored.

The findings of the current thesis indicated some differences in the timeline of acquisition of mental state understanding in Pakistani children when compared to existing Western literature (see chapter 3). This was substantiated by the findings of a cross-cultural study that compared the performance of White British, British Pakistani and Pakistani children on a scale of ToM (see chapter 4). The findings of this cross-cultural study indicated that the White British children outperformed both British Pakistani and Pakistani children on measures of Tom, EF and social competence. The thesis also established the universality of links between ToM and EF as well as social competence. Parental factors, specifically parenting sryles and maternal mental state talk were also found to be associated with mental state understanding. Furthermore, age, EF, parenting styles and MMST were found to be strong predictors of ToM in Pakistani children (see chapter 5). This chapter draws together the findings of empirical chapters and discusses their implications.

6.2 Review of Studies Included in the Thesis

A total of four research studies have been included in this thesis. The first study tested 65 Pakistani children between the ages of 5-8 years on 4 ToM tasks (desire, FB content, emotion and deception) and 2 peer acceptance tasks (sociometric status and self-perceived peer acceptance). The findings indicated that 5-year-olds performed worse than chance on overall ToM tasks, however, the

6, 7 and 8-year-olds performed at chance. These findings indicated a lag of at least 2-3 years in ToM acquisition of Pakistani children when compared to Western children from individualist cultures (Wellman et al. 2001). No association was found between ToM ability and peer acceptance tasks.

The second study investigated a larger sample of children (150) between the ages of 5-8 years from a similar Pakistani population. The ToM tasks in this study were modified to exclude the task that children in the first study found most difficult, replacing it with a comparatively easier task (the deception task was replaced with a false belief location task). Four EF measures were introduced and a new measure of social competence was also included (Multisource Assessment of Social Competence Scale) which provided teacher's ratings of pro-social and antisocial behaviours exhibited in interaction with peers. The findings of Study 2 replicated those from Study 1 in that 5-year-olds performed worse than chance on overall ToM tasks, whereas the 6 and 7-year-olds performed at chance. However, in Study 2, children moved from at chance performance on ToM tasks to better than chance performance in their 8th year. In addition, the findings also indicated that ToM ability was significantly and positively associated with both EF ability and pro-social behaviour.

The third study investigated ToM development in a cross-cultural sample. Data was collected from Pakistani (91), British Pakistani (108) and White British (80) children (age range 4-7 years). ToM was measured using a scale developed by Wellman and Liu (2004), which tests children's understanding of five mental states. EF was measured using three tasks, and the teachers provided ratings for social competence. Significant cultural differences were found on all the variables. The findings of the study indicated that the White British children outperformed British Pakistani and Pakistani children on measures of ToM, EF and pro-social behaviour. However, there were no significant differences between the performance of British Pakistani and Pakistani participants. The study also investigated the universality of association between ToM, EF and social competence. The findings indicated that ToM was positively associated with both EF and social competence across cultures.

The fourth and final study was designed to investigate two parental factors that have been suggested to influence ToM development. There is some evidence to link parenting styles and maternal mental state talk to children's ToM development in Western societies (Hughes et al. 1999; Ruffman et al. 2002; Adrian et al. 2007). The study investigated the universality of links between ToM and these two parental variables; parenting styles and maternal mental state talk (MMST). The findings from this study indicated significant positive associations between ToM and both authoritative parenting style and MMST in the Pakistani sample. Furthermore, both variables were significant predictors of ToM, along with age and EF.

6.3 Discussion of Main Findings

The main findings of the above-mentioned studies and their implications have been categorised into three topic areas for discussion. First, the cultural variations in development of ToM will be discussed with reference to Pakistan as a collectivist society. The possible explanations and implications of these differences are are discussed. The second section will discuss the possible links between ToM, EF, and social competence. The final section includes a discussion of the parental variables as predictors of ToM. Specific consideration has been given to cultural aspects of these variables with reference to Pakistani society.

6.3.1 ToM Development in Pakistani Children

As mentioned above, the first aim of the thesis was to investigate the variations in ToM understanding in the unique cultural context of Pakistan. The findings of the studies included in chapter 3 indicated that the Pakistani children made a transition from at chance performance to above chance performance on ToM tasks in their 8th year (when tested on four ToM tasks). These children's understanding of ToM appeared to be delayed by at least 2-3 years: existing literature suggests an above chance performance on FB tasks appears at 4 years of age (Wellman et al. 2001). A variety of mental states were tested in the first two studies including desire, FB content, FB location, emotion, and deception. However, not all mental states were understood simultaneously: children performed well on some task (such as desire) before others. In their 5th year

children performed at chance on the desire task (which is consistent with the findings of Nawaz et al. (2014) for a Pakistani sample), and worse than chance on the FB content, FB location, emotions, and deception tasks. A transition from at chance to above chance performance was observed in their 6th-7th year on the desire task, and in their 8th year on the FB location task. In their 8th year, children's performance was still at chance on the FB content and the emotion task, and worse than chance on the deception task. These findings are in contrast to the universal approach, which claims that children across all cultures acquire an understanding of mental states at similar age (Wellman et al. 2001). In addition, these results provide support for a social constructivist perspective, which postulates that social interaction influences the development of mental state understanding (Carpendale and Lewis 2004). The consistency in the findings of both studies might indicate a genuine delay in the acquisition of ToM in Pakistani children. However, both studies were conducted in public schools (that mainly cater to low and lower middle SES) so the likelihood of the sample being from lower SES raises some doubts about such a conclusion. Existing literature indicates that SES is associated with performance on false belief tasks; in particular lower SES has been associated with poor performance on false belief tasks (Cutting and Dunn 1999; Cole and Mitchell 2000; Pears and Moses 2003). The problems associated with lower SES such as marital instability, unresponsive parenting styles, poor child vocabulary and inefficient language processing, can all contribute to a delayed ToM understanding (Bradley and Corwin 2002; Conger and Donnellan 2007; Conger et al., 2010; Fernald et al., 2013). Study 3 therefore, tested children from private schools (assumingly with a middle SES) and compared their performance with a sample from an individualistic society (United Kingdom).

6.3.2 Cross Cultural Findings

Study 3 detailed in Chapter 4, compared mental state understanding in three varied cultural groups; White British, British Pakistani and Pakistani children. The findings from this cross-cultural comparison indicated that White British participants performed better than both British Pakistani and Pakistani participants. These findings were important for two reasons. Firstly, a direct comparison of

Pakistani and White British children verified the delayed performance on ToM tasks found in first two studies. Secondly, the similar performance of Pakistani and British Pakistani participants highlighted the importance of early social interactions in the development of mind understanding. The findings also provided support for the 'collectivist vs. individualist culture' hypothesis (Liu et al. 2008; Shahaeian et al. 2011). Children from an individualist culture outperformed not only those living in a collectivist society but also those living in an individualist society but probably practicing values of a collectivist culture at home.

Before children start going to school, the interactions at home (with parents and siblings) play an important role in the development of social understanding. For instance, it has been found that children from larger families show advanced ToM skills, and this effect is stronger for younger siblings than firstborns (Ruffman et al. 1998). Younger children appear to have this advantage for two possible reasons; one, they engage in interactions with a skilled partner (their older sibling) in play, and two, they have opportunities to witness their older siblings interact with others (Hughes and Leekam 2004). The firstborns on the other hand did not have these chances to engage with older siblings or witness any interactions. Such findings provide support for the importance of early social interaction in ToM development. Although in the current research the size of family or sibling effect was not investigated, the findings provided strong support for the role of early familial interactions in the development of ToM.

Although, the British Pakistani participants lived in a very different environment (an individualistic culture) than Pakistani participants (who live in a collectivist culture), their performance on ToM tasks was no different than that of Pakistani participants. The empirical evidence suggests that individuals migrating from collectivist to individualist societies struggle to adjust to the new culture (Bhugra 2004) and that parents serve to strengthen and preserve the second generation's sense of native culture (Akiyama 2008). In this case the Pakistani parents who had migrated to an individualistic society might emphasize the importance of collectivist values of interdependence, obedience, and conformity rather than independence, self-assertion and autonomy that are highly valued in

individualistic cultures. It was therefore presumed that the British Pakistani and Pakistani participants were exposed to similar patterns of early interactions at home, which might have influenced their mental state understanding. One example of such similarities is engaging children in a book reading activity. Both Pakistani and British Pakistani parents indicated reading books to their children rarely, as compared to White British parents who indicated frequent (almost daily) book reading activities.

However, as children grow older the experiences outside the home (with teachers and peers) might also contribute to their developing ToM. The comparison of Pakistani and British Pakistani participants' performance provided an opportunity to investigate the external influences on ToM understanding. If the home environment and familial interactions were more influential in the early stages of ToM understanding, it could be interesting to investigate how young British Pakistani children's ToM understanding changes once they start school. The difference between the two samples (Pakistani and British Pakistani) is that the Pakistani participants face a similar culture outside the home, whereas the British Pakistani participants will be exposed to different cultural values in schools than they might have experienced at home. This contrast provided a unique opportunity to test the influence of larger culture on ToM development in the current research. Although it was found in the current research that 4 to 5-year-old White British participants performed significantly higher than both British Pakistani and Pakistani participants on the ToM scale, there was no significant difference between the performance of 6 to 7-year-old White British and British Pakistani participants. At this age, the British Pakistani children had 'caught up' with their White British counterparts. However, the Pakistani participants still performed significantly lower than the White British participants. This progress of British Pakistani children could possibly be attributed to two factors; exposure to different cultural values outside the home, and/or the role of pedagogical strategies used in the British educational system

It is interesting to note here that the educational systems used in different countries appear to reflect the cultural values associated with those societies. For

example, in Pakistan the schools use a more directive approach to teaching which emphasises the acquisition of factual knowledge by repetition or rote learning (Sultana 2001; Jaffer 2005). Most of the schools use an instructor or teacher lead approach where the students are considered passive receivers of information. Conformity to group norms is stressed and individual opinions or disagreements are discouraged. In addition, there is a strong emphasis on testing and examinations. Teachers often run through the course to meet deadlines, and children depend on memorizing facts rather than understanding the concepts. This approach to teaching reflects the Pakistani society's emphasis on conformity to authority and interdependence where others are given more importance than one's self. On the other hand, most Western countries use a child-centred approach that focuses on the needs of individuals and emphasizes creativity, innovation and autonomy. In the Western educational system for example, a child's participation in classroom activities is highly valued. Children are encouraged to express their opinions and are treated as active participants in the process of learning. Such approaches to education provide opportunities to develop as independent thinkers rather than just memorizing the information. This contrast in pedagogical strategies could have played an important role in acquisition of mental state understanding (Wang et al. 2016). Findings from the cross-cultural study included in this thesis provide some support for the 'pedagogical hypothesis' for the cultural variations in ToM understanding (Lecce and Hughes 2010). Although the hypothesis also claims that age of entering schools can influence the mental state understanding, our findings contradict this notion. In the current study children from all the cultural groups started school at the same age (4 years), however starting school at the same time as White British children did not improve ToM understanding of Pakistani or British Pakistani children. Furthermore, majority of White British and British Pakistani children had attended day care and nurseries before starting the school, but that also didn't help improve the mental state understanding of British Pakistani children. It is possible that the pedagogical strategies used in schools play a greater role in the acquisition of ToM compared to the age of entering the school.

Based on Bronfenbrenner's 'ecological systems theory', Mizokawa and Komiya (2014) suggested that ToM development is influenced by the interaction of multiple ecological environments. Bronfenbrenner proposed five layers of ecological systems based on the distance from the individual (proximal to distal); microsystem, mesosystem, exosystem, macrosystem, and chronosystem. He suggested that development is influenced by multiple environmental systems and the interaction within and between these systems. Accordingly, mental state understanding is also influenced by proximal environmental systems, which include parents, siblings, peers, and the interaction between these systems, as well as by the distal environments such as socio-economic status, educational system, and culture (Mizokawa and Komiya 2014). The interaction between various ecological systems also plays an important role. For example, parent-child interactions are influenced by the presence of siblings, quality of marital relationship, socio-economic status, as well as the prevalent cultural values (Goldberg and Easterbrook 1984; Dunn et al. 1991; Vinden 2001; Abe 2008). The findings of the current thesis appeared to provide some support for the influence of various ecological systems (and their interaction) on the development of ToM. It is suggested by the current author that the mental state understanding of Pakistani and British Pakistani children was influenced not only by the environment at their homes (proximal environment), but also by the educational systems (distal environment) they were exposed to. Furthermore, the interactions between these environments could be of importance for ToM development. Future research could explore the impact of these environmental interactions on ToM development. For example, for British Pakistani children the cultural differences between the home and school environment may provide an opportunity to develop an understanding of diversity in opinions and the consequent behaviours. It would be interesting to explore how these two environments interact, and the influence of this interaction on ToM development.

Other possible reasons for Pakistani children's' delayed performance on ToM tasks could include difficulties with the additional cognitive and verbal skills required for passing these tasks. For example, there is substantial empirical

evidence to link ToM with EF skills (Carlson and Moses 2001; Carlson et al. 2004; Devine and Hughes 2014) and that variations in EF predict later differences in ToM (Flynn 2007; Muller at al. 2012; Devine and Hughes 2014). It has also been claimed that children's failure on ToM tasks is due to limitations in EF skills (such as inhibition control) required by the tasks. The results of Study 3 revealed that White British participants outperformed the Pakistani and British Pakistani participants on EF skills too. There is a possibility that the delay in Pakistani participant's ToM understanding could be due to their less developed EF skills (compared to White British participants).

Other researchers have highlighted the verbal conversational aspect of ToM tasks (Lewis and Osborne 1990). They argue that children's failure on ToM tasks is due to their inability to comprehend the questions, or due to the questions being unclear. For example, in a location change false belief task when a child is asked 'Where will Sally look for the marbles', the child might interpret the question as 'where will Sally end up looking for marbles after failing to find it where she had first put it' (Wellman et al. 2001). This would result in the child giving an incorrect response. In addition, it is possible that language issues affected the current research as the tasks were translated from the source language (English) into Urdu. The translation procedures could have caused some verbal confusion for children. For example, the Urdu word 'Samjha' means understood, but is also interchangeably used for 'sochna' or thought. So in the ToM tasks when the researcher asks, 'what does the character think is in the box'? the literal translation of think is 'soch', however the word 'samajhna' (understood) is often used interchangeably. Further research is required to identify any verbal difficulties posed by the use of specific words in the translated questions for ToM tasks. In addition future research on ToM with Pakistani children should also measure children's verbal ability, to check that they can understand the language used in the tasks.

6.3.3 Links between ToM, Executive Functions and Social Competence

The current research also investigated whether the relationship of ToM with EF and SC reported in Western individualistic cultures remains the same in the current sample from a collectivist Pakistani culture. The findings of the three studies that investigated the relationship between ToM and EF were consistent with the existing literature. A significant positive relationship was found between ToM and EF in all the studies providing a strong support for the universality of this link. There is a debate regarding the link between Tom and EF, and the findings of this thesis provide some support for what is known as the emergence account, rather than the expression account. The expression account postulates that children fail ToM tasks due to the executive demands of these tasks, rather than the conceptual understanding (Moses 2001). In other words, children possess the concept of mental states but have difficulty expressing it due to the demands of the task. So according to this account, improvements in EF should result in improvements in ToM, but not vice versa. The emergence account on the other hand considers EF to be a pre-requisite for ToM understanding (Moses 2001). In order to understand different perspectives, children need some level of EF to allow them to differentiate between their own knowledge/perspective and that of others.

The results of cross-cultural study revealed that at 4-5 years of age White British participants outperformed both Pakistani and British Pakistani participants on measures of EF, as well as ToM. However, there were no significant differences between the 5-6 year old White British and Pakistani participants' performance on EF tasks, but the White British participants still had an advantage in ToM. This advantage in ToM task remained consistent even for 6-7 year old White British participants. If the expression account was accurate, then the ToM performance of Pakistani participants should have improved along with progress in EF. However, that did not appear to be the case in the current research. Furthermore, the 5-6 year British Pakistani participants caught up with White British participants on ToM performance, but were significantly delayed in their EF abilities. Again, according to expression account lack of EF abilities should have hindered the expression of mental state understanding in British Pakistani participants, but this did not

happen. The current findings suggest that EF is required for developing an understanding of mental states (emergence account), and not just for expression of an already existing ToM (expression account).

Regarding the link between ToM and social competence the findings of the current research are consistent with previous reports from Western literature. A positive association between ToM and pro-social behaviour was found in the three studies of current thesis that used teachers' rating of social competence (MASCS). The current findings indicated that the children who exhibited a better understanding of desires, beliefs, and emotions of their peers were rated higher on levels of empathic and co-operative behaviours by their teacehrs. On the contrary, children with lower mental state understanding were reported to exhibit high levels of disruptive and impulsive behaviours. This clearly indicated that a better understanding of others' mental states allows children to behave in a socially appropriate manner. However, this association between ToM and social competence may be subject to how social competence is measured. In the current research, two indicators of social competence were investigated; peer acceptance/likability (sociometric status), and pro-social/antisocial behaviours. No significant association emerged between sociometric status and ToM, indicating that whether children are liked or disliked in a group is not necessarily associated with their ability to understand their peers' mental states. This could possibly indicate that children's likes and dislikes are probably based on other factors than the ability to understand mental states and respond appropriately. However, teachers' reports of a child's pro-social/antisocial behaviours in classroom were associated with ToM in all the experiments of the current thesis. Children with higher co-operative skills and empathy performed better on ToM tasks compared to those who exhibited more disruptive behaviours and impulsivity. There is a possibility that teachers and peers evaluate a child on different criteria when it comes to socially appropriate behaviours. Children might focus on mutual play interests or physical proximity (sitting adjacent to each other) than co-operative skills. Teachers on the other hand focused on behaviours that indicated better social skills such as initiating conversations and helping others. Future research

could compare information from various sources (teachers, parents, peers) on social competence to identify how their views on social competence differ from each other. This will provide more comprehensive information about the behaviours that are considered socially skilful by individuals who interact with the child in different settings (e.g. classrooms and home).

6.3.4 Role of Parenting

The current research also investigated the role of parental factors in the cognitive and social development of young children. Specifically, two parental factors were explored; parenting styles and maternal mental state talk (MMST), as both of these have been associated with mental state understanding in Western individualistic societies (Ruffman et al. 2002; Pears and Moses 2003; Symons et al. 2005; O'Reilly and Peterson 2014;). The current reearch found more similarities than differences in parenting styles and ToM between Western and Pakistani culture. A positive association between authoritative parenting style and ToM was found, supporting previous findings from Western individualist societies, and providing some support for the universality of the link between parenting styles and ToM (O'Reilly and Peterson 2014). In addition, a negative association between authoritarian parenting style and mental state understanding was found, corroborating existing findings of negative links between high levels of parental control and ToM in Western individualistic societies (Hughes et al. 1995; Pears and Moses 2003). Authoritarian parenting style was also found to be negatively associated with EF and pro-social behaviours in the current research, whereas it had a positive association with antisocial behaviours. Taken together these findings suggested that parental attitudes and practices in early childhood have important implications for cognitive, as well as social development of children. Specifically, parenting strategies associated with authoritative style such as warmth, open communication, and reason based discipline, had more beneficial effects on the cognitive development of young children. On the other hand, strict parental control, power assertive discipline techniques (such as yelling and spanking), and lower levels of responsiveness appeared to have negative impact on children's cognitive and social development.

Previous research with Pakistani children (8 years and above) and adolescents have reported that authoritative parenting was associated with positive child/adolescent outcomes (such as social acceptability, sharing with others, overall socio-emotional adjustment), whereas authoritarian parenting was associated with negative outcomes (such as conduct problems, anxiety, and depression) (Kausar and Shafique 2008; Akhtar et al. 2011; Rizvi and Najam 2015). The findings of the current research not only corroborated previously existing conclusions about the association between parenting styles and social behaviours in Pakistani sample, but also extended it to include a younger age group (4 to 7-year-olds). The findings of current research indicated that authoritative parenting is associated with positive outcomes even in younger Pakistani children. However, consideration should be given to the fact that the sample of study included in current thesis was selected from an urban setting, and therefore majority of the mothers had at least 14 years of education and were presumably from a middle SES. Empirical evidence indicates that parenting styles are influenced by various demographic variables, including SES and parental educational level (McLoyd 1990; Shumow et al. 1998; Kashahu et al. 2014). The current findings therefore may not be a true representative of the entire population and should be interpreted with caution. Future research could explore variations in parenting styles in different SES groups, as well as various educational levels in a Pakistani sample to provide more representative data.

6.3.5 Maternal Mental State Talk

Maternal mental state talk (MMST) has been associated with ToM development in children from individualist Western cultures (Ruffman et al. 2002). Research also indicates some cultural variations in the content of the language that mothers use with their children (Tardif et al. 1997). However, to the current author's knowledge no published literature is available on the content of parent child conversation in Pakistani culture. The current research has for the first time, explored the frequency of references made to mental states by Pakistani mothers during a story telling session with their child. Regarding maternal mental state talk (MMST) and its association with ToM, the findings of current thesis indicated some

differences as well as similarities when compared with literature from Western cultures. The differences mainly lie in the type of mental states referred to more frequently by mothers. The Western literature indicates that mothers made most frequent references to ‘think’ and ‘know ‘(cognitive) terms followed by ‘desire’ terms (Ruffman et al. 2002). In the current sample, however, most frequently used mental state terms were related to emotions (happy, sad, frustrated, excited, etc.), followed by general mental states (such as remember, consider, forget, imagine), desire mental states (want, wish like to), cognitive mental states (think and know), and modulation of assertion (maybe, suppose, possible, perhaps, etc.). The frequent use of emotion mental state terms rather than cognitive mental state terms by Pakistani mothers may be a result of them perceiving their child as dependent, and being more concerned about keeping them emotionally stable rather than treating them as autonomous and thinking beings. The study carried out for this PhD was the first (to the author’s knowledge) that investigated the content of maternal discourse in a Pakistani sample, so it is hard to draw any firm conclusion at this point. Since previous research has reported cultural variations in content of maternal talk (Italian vs. British mothers) with children (Tardif et al. 1997) there is a possibility that Pakistani mothers have a genuine tendency to use more emotion terms, than cognitive or desire terms. However, this could also be a result of a methodological issue: the books used in the current study might just have offered more opportunities to refer to emotional mental states than any other mental states. In future, caution should be taken in selection of measurement tools for MMST in order to to overcome such methodological issues. Furthermore, in the current research MMST in Pakistani sample was not compared to any other cultural group. It would be interesting for future research to compare the discourse of Pakistani mothers with that of mothers from a Western culture.

Despite the variations found in the type of mental states frequently referred to by Pakistani mothers, the association between MMST and ToM remained consistent with Western literature. The findings of the current research revealed a positive relationship between MMST and mental state understanding in children. The mothers who made more references to mental states of the characters in

stories had children who scored higher on measures of ToM, after controlling for the effect of age. Furthermore, MMST also emerged as a significant predictor of ToM along with age, EF, and parenting styles. These findings provided support for the hypothesis that exposure to mental state terms in discourse with adults promotes genuine representational understanding of mental states in children, rather than just imitation of the words that they hear (Symons 2004). The findings of the current research also indicated that the children who exhibit better mental state understanding elicit more mental state talk from their mothers. Taken together these findings appear to support the idea that the social influences on ToM understanding are child specific (Hughes and Cutting 1999). There is a complex interaction between the child characteristics (such as cognitive abilities), family environment (parenting styles and discourse), and other social influences (such as SES, peers, teachers and culture at large) and therefore, it is not conceivable to understand how a child's ToM develops in isolation.

6.4 Future Directions

The findings of the current innovative research reported in this thesis have multiple implications for future exploration. First and foremost, it is important to further investigate variations in ToM acquisition in different cultural settings. The current findings indicated that the ToM development in Pakistani children was delayed compared to British children. Future research should focus on identifying various cultural factors associated with ToM development in different populations. Specifically, in Pakistani context it would be crucial to identify a) the causes of delayed performance and b) the factors that can help to augment mental state understanding. In addition, future research should also investigate ToM understanding in older Pakistani children as well as adolescents to highlight the developmental differences, if any. Direct cultural comparisons will allow investigating whether older children catch up on ToM understanding with their Western counterparts.

An examination of interaction between various layers of environment (from proximal to distal) is crucial to understanding the development of ToM. The current research provided strong support for the role of parenting strategies, and parent

child conversation for children's social and cognitive development. However, the role of siblings, extended families, and peers in the context of Pakistani culture, was not covered in the current thesis and should be investigated in future. As discussed in the previous section, the findings of this thesis highlighted differences in the content of maternal mental state talk when compared with Western literature. Since a strong association exists between content of parent-child conversation and ToM, the future research in Pakistan could further investigate the contents of maternal discourse. Furthermore, parental practices like mutual storybook reading activities should also be explored for their role in the development of mental state understanding. These parent-child interaction practices vary in different cultures and it would be interesting for the future research to investigate their association with ToM.

In addition, the current research was limited to a specific area and demographic variables (such as SES, family system and parental education). Future research on ToM in Pakistan should focus on including samples with diverse demographic characteristics to get a better picture of social correlates of ToM in Pakistan. For example, the parent-child interaction in nuclear families might be very different from those in extended families (living with grandparents, uncles, aunts, cousins). Similarly, the life style in urban cities is very different from the rural areas in Pakistan. For example, many women in cities work outside the home and might have to leave their younger children at day care or nurseries. On the contrary, there is no concept of nurseries in the rural areas. However, other relatives might offer to look after the child if the parents are not available (which might not be the case in cities). These and many other differences in the demographic characteristics might influence the acquisition of mental state in young children. Furthermore, the future research should also investigate how the interaction of various ecological systems might influence ToM development.

The role of pedagogical strategies in the cognitive development of children should also be a focus for future research. It was evident from the findings of the current cross-cultural study that British Pakistani children's ToM understanding increased after they started school, but the Pakistani children did not appear to

have similar advantage from their schooling. A comparison of both British and Pakistani educational systems could provide important insights into the determinants of mental state understanding. Future research can explore the links between specific pedagogical strategies (such as use of role plays in classes) as well as general academic style (e.g. rote learning vs. conceptual learning). In addition there is a need to investigate other correlates of ToM in Pakistani sample. For instance, the literature provides strong evidence to link verbal ability to ToM in Western samples. However, in the current studies the verbal ability of Pakistani children was not tested. The future research with a Pakistani sample should include some measures of verbal ability to determine this link in Pakistani population.

Lastly, it is important to develop indigenous tasks and instruments for measuring various variables including ToM, to avoid the complications and confusions that may result from the process of translation. All the instruments used in the current thesis were translated and adapted where needed (e.g. ToM tasks), and therefore, could be susceptible to errors associated with translation. There is a need to develop measures in local languages with a specific focus on cultural relevance.

6.5 Conclusion

The research carried out for this thesis has investigated cultural variations in the acquisition of mental state understanding. In addition, the current research also investigated the associations of mental state understanding with EF, social competence, parenting styles, and maternal mental state talk in an Eastern collectivist culture. The findings of this thesis have highlighted the complex interaction of cultural, familial, and personal factors in the development of mental state understanding. Findings from four innovative research studies indicated a delay in ToM development in Pakistani children, which is in accordance with the 'collectivist vs. individualist hypothesis' (Liu et al. 2008; Shahaeian et al. 2011). These findings signify the need to further investigate various cultural factors that might hinder or contribute to the development of ToM. The current research also emphasized the role of immediate (such as family) and distal environments (such

as cultural influence on educational systems) in cognitive development. Interactions with parents appeared to be important contributors to mental understanding. The findings of the thesis accentuated the importance of parenting strategies and content of parent-child conversations in mental state understanding. Specifically parenting strategies that incorporate warmth, encouragement, open communication and positive control techniques had beneficial effects for mental state understanding. In addition, the use of mental state words in every day communication was also found to be associated with mental state understanding in the current sample. The results of this thesis also suggested the possible effect of pedagogical strategies used in schools on the acquisition of ToM ability. However, these effects need further exploration. The current research also provided support for the universality of associations between ToM and EF. With regards to links between ToM and social competence, the current findings showed a positive association between mental state understanding and teacher's reports of pro-social behaviours. Specifically, the current findings provided support for a bidirectional association between ToM and pro-social behaviours. Future research investigating the cultural sources of variability in ToM and its associations with other cognitive and social factors will add valuable knowledge in the field of cognitive development.

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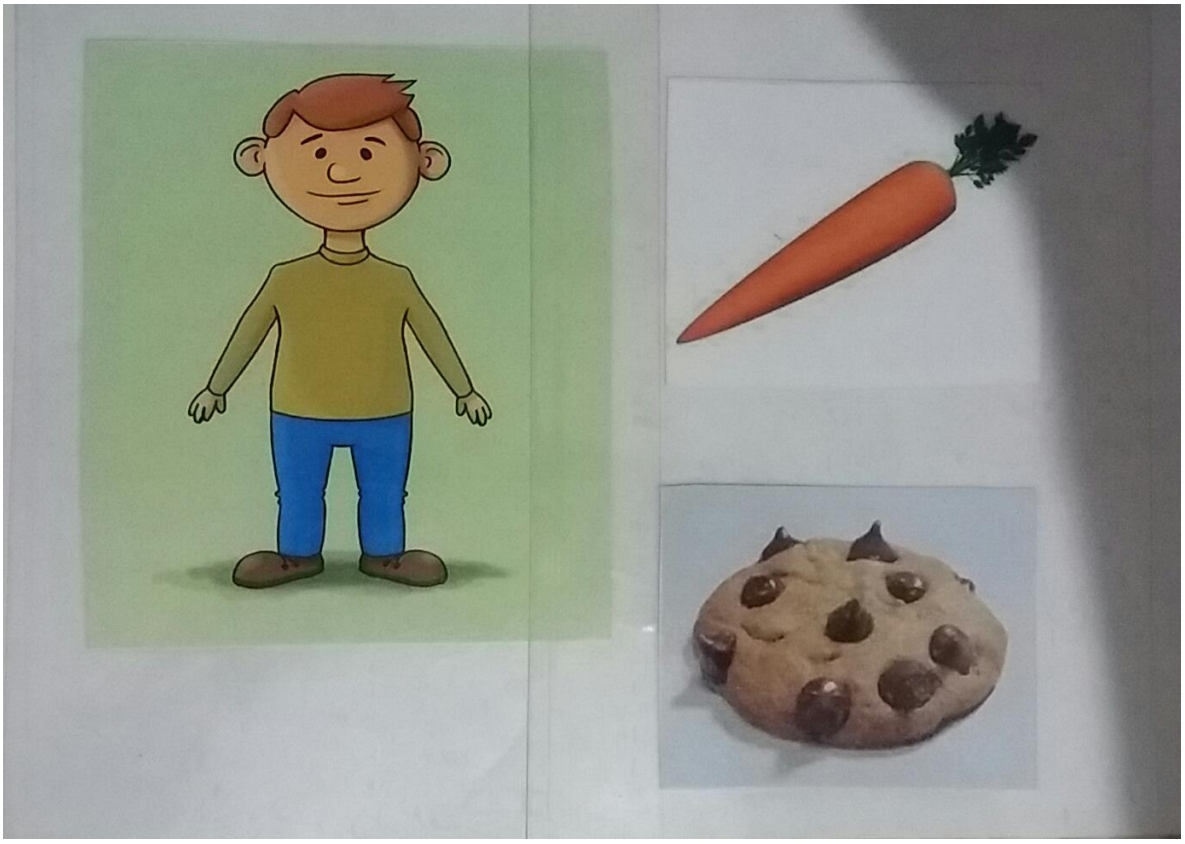
Appendix A

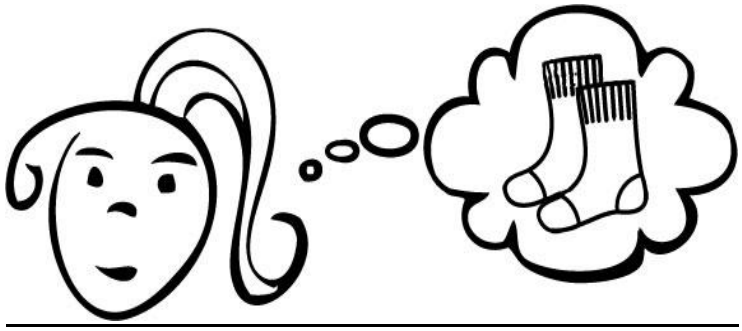
Material study 1 & 2 (chapter 3)

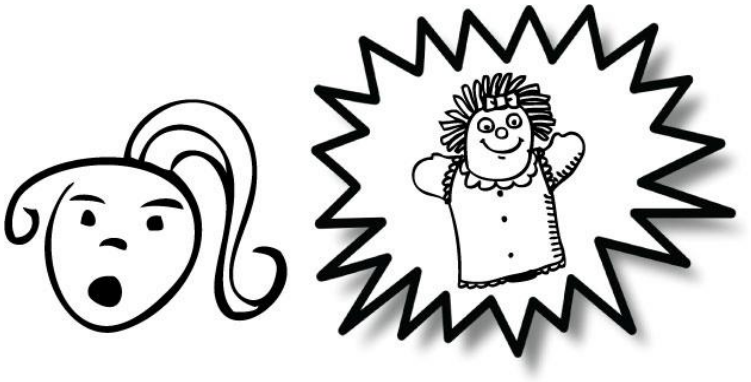
ToM tasks

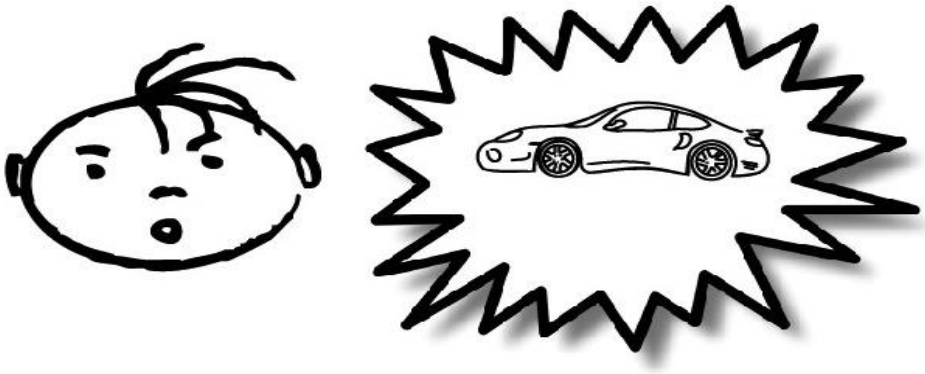
Pictures for Desire Task



Pictures for Emotion Task



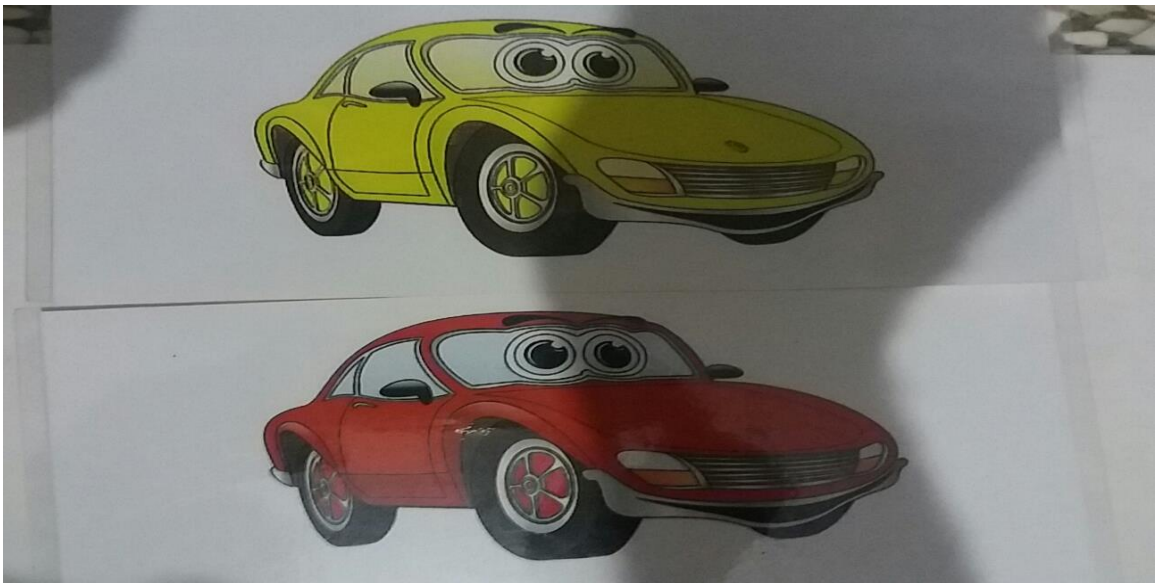




Pictures for EF tasks

Dimension Change Card Sorting

Two different coloured cars



Two different colored flowers

Day and Night Stroop Task

Response Record Form for Study 1 & 2

Response Record Form

School:

Participant ID: Gender

Age: Class:

	Tasks	Response	Comments
1			
2			
3			
4			

5	Day & Night Stroop																				
	Practice Trials					Test Trials															
	1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
6	Peg Tapping																				
	Practice Trials					Test Trials															
	1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7	Card Sorting																				
	Practice Trials					Test Trials															
	1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8	Hand Test																				
	Practice Trials					Test Trials															
9	Bear-Dragon Test																				
	Practice Trials					Test Trials															
	1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Sociometric Status

	Name Class Fellow	Likes	Dislikes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Multisource Assessment of Social Competence Scale (MASCS)

(teacher version)

Read the following statements carefully and rate the child's behaviour on the given scale:

1 = Never, 2 = Rarely, 3= Frequently, 4 = Very Frequently

Please make sure that you tick only one box for each statement.

		1 Never	2 Rarely	3 Frequently	4 Very Frequently
1	Offers help to other students.				
2	Effectively participates to group activities.				
3	Invites other students to participate in activities.				
4	Is skillful in starting conversations with mates.				
5	Co-operates with other students.				
6	Knows how to be a good friend				
7	Is sensitive to the feelings of others.				
8	Shows acceptance of other students.				
9	Has "a short fuse".				
10	Has temper outbursts or tantrums.				
11	Is easily irritated.				
12	Teases and makes fun of other students.				
13	Argues and quarrels with peers.				
14	Bothers and annoys other students.				
15	Acts without thinking.				

Reliability of MASCS for study 2

Subscales	**Number of items**	**Alpha**
Pro-social	8	.868
Antisocial	7	.882

Appendix B

Material for study 3 (Chapter 4)

Script for ToM Scale

Diverse Desires

‘‘Here’s Mr. Hamza. It’s snack time, so, Mr. Hamza wants a snack to eat. Here are two different snacks: a carrot and a cookie. Which snack would you like best? Would you like a carrot or a cookie best?’’

‘‘Well, that’s a good choice, but Mr. Hamza really likes cookies. He doesn’t like carrots. What he likes best are cookies.’’

‘‘So, now it’s time to eat. Mr. Hamza can only choose one snack, just one. Which snack will Mr. Hamza choose? A carrot or a cookie?’’

Diverse Beliefs

‘‘Here’s Amna. Amna wants to find her cat. Her cat might be hiding in the bushes or it might be hiding in the store room. Where do you think the cat is? In the bushes or in the garage?’’ This is the own-belief question.

If the child chooses the bushes: ‘‘Well, that’s a good idea, but Amna thinks her cat is in the store room.

She thinks her cat is in the store room.’’

‘‘So where will Amna look for her cat? In the bushes or in the store room?’’

Knowledge Access

‘‘Here’s a box. What do you think is inside the box?’’

‘‘Let’s see it’s really a toy mouse inside!’’ ‘‘Okay, what is in the box?’’

‘‘Hira has never ever seen inside this box. Now here comes Hira. So, does Hira know what is in the Box? ‘‘Did Hira see inside this Box?’’

Contents False Belief

The child sees a clearly identifiable sweets box with a pencils inside the closed box.

‘‘Here’s a sweets box. What do you think is inside the sweets box?’’ ‘‘Let’s see! It’s some pencils inside!’’

‘‘Okay, what is in the sweets box?’’

‘‘Ahmad has never ever seen inside this box. Now here comes Ahmad. So, what does Ahmad think is in the box? Sweets or pencils? ‘‘Did Ahmad see inside this box?’’

Real – Apparent Emotion

‘‘This story is about a boy. I’m going to ask you about how the boy really feels inside and how he looks on his face. He might really feel one way inside but look a different way on his face. Or, he might really feel the same way inside as he looks on his face. I want you to tell me how he really feels inside and how he looks on his face.’’ ‘‘This story is about Omar. Omar’s friends were playing together and telling jokes. One of the older children, Hassan, told a mean joke about Omar and everyone laughed. Everyone thought it was very funny, but not Omar. But, Omar didn’t want the other children to see how he felt about the joke, because they would call him a baby. So, Omar tried to hide how he felt.’’

‘‘What did the other children do when Hassan told a mean joke about Omar?’’ (Laughed or thought it was funny.) ‘‘In the story, what would the other children do if they knew how Omar felt?’’ (Call Omar a baby or tease him.)

‘‘So, how did Omar really feel, when everyone laughed? Did he feel happy, sad, or okay?’’

‘‘How did Omar try to look on his face, when everyone laughed? Did he look happy, sad, or okay?

متفرق خواہشات

یہ ہیں جناب حمزہ . یہ سنیک کھانے کا وقت ہے، تو جناب حمزہ سنیک کھانا چاہتے ہیں.یہاں دو قسم کے سنیکس ہیں، ایک گاجر اور ایک بسکٹ.آپ کون سا سنیک پسند کریں گے؟ آپ کو گاجر پسند ہے یا بسکٹ؟
ٹھیک ہے، یہ ایک اچھا انتخاب ہے، لیکن مسٹر حمزہ واقعی بسکٹ پسند کرتا ہے.
انہیں گاجر پسند نہیں .انہیں سب سے زیادہ بسکٹ پسند ہیں.
تو، اب اس کے کھانے کا وقت ہے. جناب حمزہ سے صرف ایک سنیک منتخب کر سکتے ہیں، محض ایک. جناب حمزہ کون سا سنیک انتخاب کریں گے؟ ایک گاجر یا ایک بسکٹ؟

متفرق عقائد

آمنہ یہاں ہے. آمنہ اپنی بلی کو تلاش کرنا چاہتی ہے. اس کی بلی جھاڑیوں میں چھپی ہو سکتی ہے یا سٹور روم میں. تم کہاں سوچتے ہو بلی ہے؟ جھاڑیوں میں یا گیراج میں؟ اس کے اپنے یقین سوال ہے.

اگر بچے جھاڑیوں کا انتخاب کرتے ہیں تو: خیر، یہ ایک اچھا خیال ہے، لیکن آمنہ کے خیال میں بلی سٹور روم میں ہے.

اسکے خیال میں اسکی بلی سٹور روم میں ہے۔

تو آمنہ اپنی بلی کو کہاں ڈھونڈے گی؟ جھاڑیوں میں یا سٹور روم میں؟

علم تک رسائی

یہاں ایک ڈبہ ہے. آپ کو کیا لگتا باکس کے اندر کیاہے؟
چلو دیکھتے ہیں اس کے اندر واقعی ایک کھلونا چوہا ہے۔ ٹھیک ہے، باکس میں کیا ہے؟
حرا نےکبھی اس ڈبہ کے اندرنہیں دیکھا ۔ اب یہاں حرا آتی ہے۔ لہذا، حرا جانتی ہے کہ باکس میں کیاہے ۔کیا حرا نے ڈبہ کے اندر دیکھا ہے۔

باطل عقیدہ کی فہرست

بچہے نے واضح طور پر مٹھائی والےبند ڈبہ کے اندر پنسلیں دیکھیں
یہاں ایک مٹھائی والا ڈبہ ہے. آپ کو کیا لگتا ہے مٹھائی والے ڈبہ کے اندر کیا ہے؟ چلو دیکھتے ہیں! اس کے اندر کچھ پنسل ہیں
ٹھیک ہے، مٹھائی والے ڈبے میں کیا ہے؟
احمد نے اس ڈبے کے اندرکبھی نہیں دیکھا . اب یہاں احمد آتا ہے. لہذا، احمد کو کیا لگتا ڈبے میں کیا ہے؟ مٹھائی یا پنسل؟ کیا احمد نے اس باکس کے اندر دیکھا؟

اصل --ظاہری جذبات

یہ ایک بچے کی کہانی ہے۔ میں آپ کو کہنے جا رہا ہوں کہ کس طرح بچہ اندر سے محسوس کر رہا ہے اور اسکا چہرہ کیسا لگ رہا ہے۔ وہ شاید اندر سے کچھ اور محسوس کر رہا ہے لیکن چہرہ پر مختلف دکھائی دے رہا ہے۔ یا ہو جو اندر محسوس کر رہا ہے وہی اندر سے محسوس کر رہا ہے۔ میں آپکو بتانا چاہتا ہوں کہ وہ واقعہ کیا اندر سے محسوس کر رہا ہے اور اسکا چہرہ کیسا لگ رہا ہے۔ یہ کہانی عمر کے بارے میں ہے۔ عمر کے دوست اکٹھے کھیل رہے تھے اور لطیفے سنا رہے تھے۔ ایک بڑے بچے، حسن نے ایک برا لطیفہ سنایا عمد کے بارے میں اور ہر کوئی ہنسا۔ ہر کوئی سمجھا کہ یہ مضاحیہ ہے لیکن عمر نے ایسا نہ سوچا۔ لیکن عمر نہیں چاہتا تھا کہ دوسرے بچوں کو معلوم ہو کہ وہ اس مزاق کے بارے میں کیا محسوس کر رہا ہے کیونکہ اس طرح وہ اسے بچہ پکارتے۔ تو عمر نے کوشش کی کہ اپنے محسوسات کو چھپائے۔

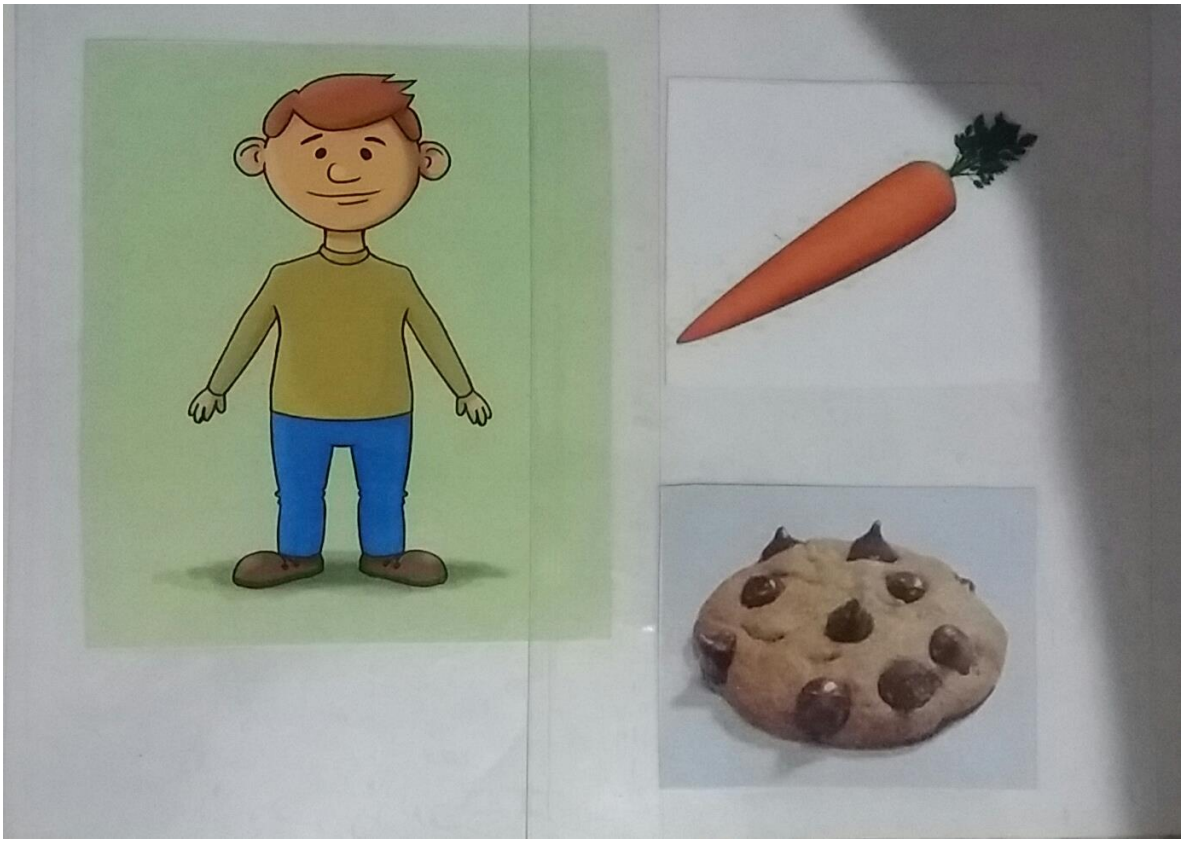
دوسرے بچوں نے کیا کیا جب حسن نے نے عمر کے بارے میں برا لطیفہ سنایا؟ (ہنسے یا سوچا کہ یہ مزاحیہ ہے) کہانی میں، دوسرے بچے کیا کرتے اگر انہیں معلوم ہو جاتا کہ عمر کیسا محسوس کر رہا ہے(عمر کو بچہ کہتے یا اسے تنگ کرتے)

تو عمر نے واقعی کیسا محسوس کیا، جب ہر کوئی ہنس رہا تھا؟ کیا وہ خوش محسوس کر رہا تھا، افسردہ تھا ہا ٹھیک تھا؟

جب ہر کوئی ہنس رہا تھا تو عمر کا چہرہ کیسا ہو گیا، کیا وہ خوش لگ رہا تھا، افسردہ لگ رہا تھا یا ٹھیک تھا؟

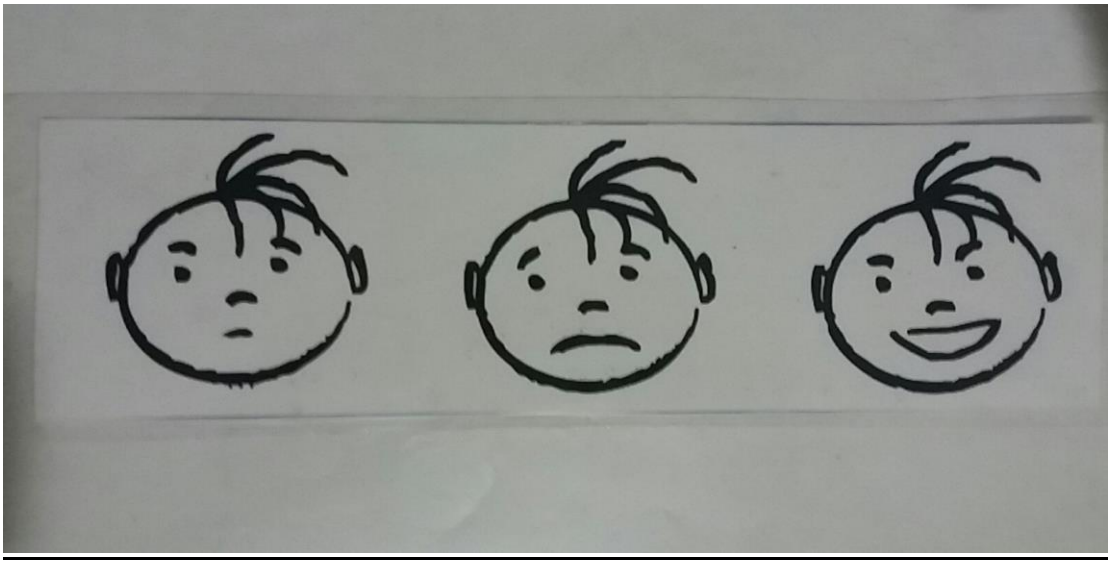
Pictures for ToM Task

Diverse Desire Task

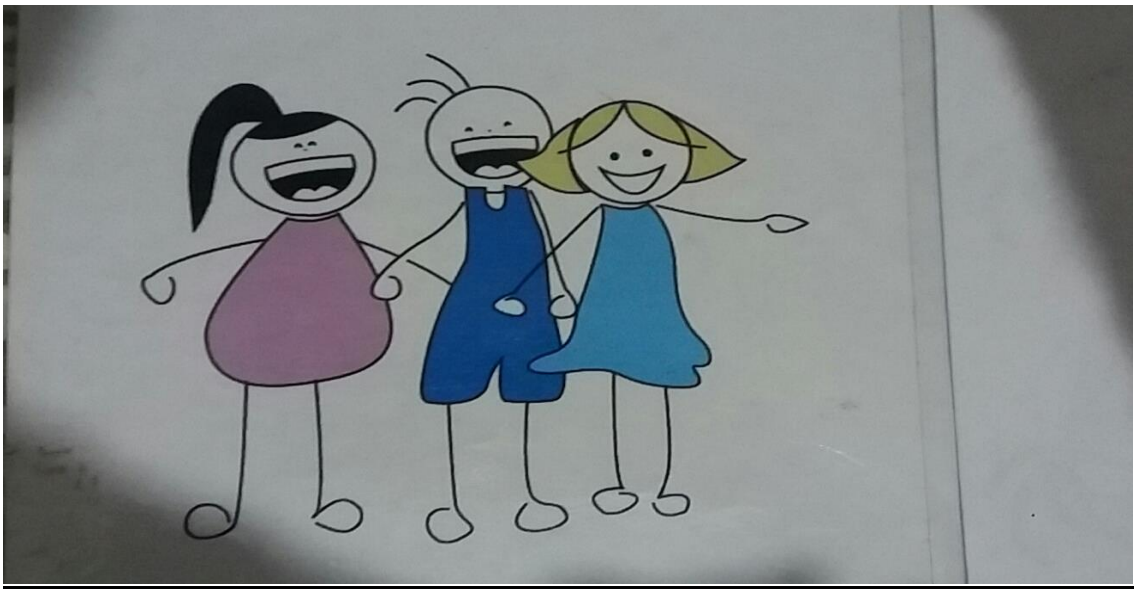


Diverse Belief

Hidden Emotion



Happy sad and normal faces



Other children making fun of the story character

Response record form used in Study 3 and 4

1	**Desire Task**															
	Self Desire								Other Desire							
	Which of the two snacks do you like?								Which snack would John select?							
2	**Day & Night Stroop**															
	1	2	3	4	5	6	7	8	9	10	11	12				
3	False Belief Location															
	Self Belief								Other Belief							
	Where do you think the cat is hiding?								Where will Sally look for the cat?							
4	**Peg Tapping**															
	1	2	3	4	5	6	7	8	9	10	11	12				
5	Knowledge Access															
	Does the character know what is inside the box?															
6	DCCS															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7	False Belief Content															
	what do you think I sinside the box?								What does the toy think is insid ethe box?							
8	Sociometric Status															
9	Hidden Emotion															
	How does the boy actualy feel								How does the boy try to look?							

Demographic Performa for British parents

This questionnaire is a part of the research being carried out at your child's school.

We would appreciate if you can answer the following questions if your child is taking part.

If a question requires circling an option or ticking a box, please make sure that you circle or tick only one option. Remember that you don't have to answer a question if you don't want to.

Gender of the child taking part in study Female ☐ Male ☐

Date of Birth of the child taking part _____

1. What is your ethnic origin? Please tick one response for mother and father.

	Father		**Mother**
	White: British		White: British
	White: Irish		White: Irish
	White: Other White		White: Other White
	Mixed: White and Black Caribbean		Mixed: White and Black Caribbean
	Mixed: White and Black African		Mixed: White and Black African
	Mixed: White and Asian		Mixed: White and Asian
	Mixed: Other Mixed		Mixed: Other Mixed
	Asian or Asian British: Indian		Asian or Asian British: Indian
	Asian or Asian British: Pakistani		Asian or Asian British: Pakistani
	Asian or Asian British: Bangladeshi		Asian or Asian British: Bangladeshi
	Asian or Asian British: Other Asian		Asian or Asian British: Other Asian
	Black or Black British: Black Caribbean		Black or Black British: Black Caribbean
	Black or Black British: Black African		Black or Black British: Black African
	Black or Black British: Other Black		Black or Black British: Other Black
	Chinese or Other Ethnic Group		Chinese or Other Ethnic Group
	Others (please specify)		Others (please specify)

2. What is your highest educational qualification? Please tick relevant (or equivalent) level for mother and father.

Mother: GCSE A Level Degree Postgraduate

Father: GCSE A Level Degree Postgraduate

Any other (please specify) _____

3. How many children are there in your family?

Older than the child who will be participating _____

Younger than the child who will be participating _____

4. What language does your family speak at home?

---

5. Did your child attend nursery before they started school?

Yes **No**

6. Did you read books or stories to your child before they went to nursery or school?

Never Sometimes Often Always

7. Select a family system that best describes your situation (circle only one option that you consider most appropriate).

a. Nuclear (parents and children only)
b. Joint (living with grand parents or uncles and aunts)
c. Extended (living as a nuclear family but frequent contact with extended family)
d. Other (Please explain)

_____

_____

_____

_____

<u>The following questions are only for those parents who consider themselves to be from a non-White/British ethnic background.</u>

8. Please tick the box that best describes your birth heritage:

Mother:

You were born in a different country and migrated to Britain when you were a child

You were born in Britain but at least one of your parents was born in a different country

You and both your parents were born in Britain, but at least one of your grandparents was born in a different country

You do not know your birth heritage

Father:

You were born in a different country and migrated to Britain when you were a child

You were born in Britain but at least one of your parents was born in a different country

You and both your parents were born in Britain, but at least one of your grandparents was born in a different country

You do not know your birth heritage

9. To what extent do you and your family try to create your native culture at home? Please circle ONE answer:

To a great extent To some extent Very little Not at all

10. To what extent do you and your family try to follow the British style of life at home? Please circle ONE answer:

To a great extent To some extent Very little Not at all

Demographic Performa for Pakistani parents

This questionnaire is a part of the research being carried out at your child's school.

We would appreciate if you can answer the following questions if your child is taking part.

If a question requires encircling an option or ticking a box, please make sure that you encircle or tick only one option. You don't have to answer a question if you don't want to.

Gender of the child taking part in study F M

Date of Birth of the child taking part _____

What is your ethnic origin?

	Father			**Mother**
	Punjabi			Punjabi
	Sindhi			Sindhi
	Pakhtun			Pakhtun
	Balochi			Balochi
	Afghani			Afghani

2. What is your highest educational qualification?

Mother: Primary Matric Intermediate Bachelors

Masters

Father: Primary Matric Intermediate Bachelors

Masters

4. How many children do you have?

Older than the child who will be participating _____

Younger than the child who will be participating _____

5. What language do you speak at home?

---

5. Did you child attend nursery/day care before they started school?

Yes   No

6. Did you read books or stories to your child before they went to nursery or school?

Never **Sometimes** **Often** **Frequently**

7. Select a family system that describes your situation (encircle only one option that you consider most appropriate).

e. Nuclear (parents and children only)

f. Joint (living with grand parents or uncles and aunts)

g. Extended (living as a nuclear family but frequent contact with extended family)

h. Other (Please explain)

Reliability of MASCS for study 3

Subscales	**Number of items**	**Alpha**
Pro-social	8	.896
Antisocial	7	.877

Variance Inflation Factor (VIF) and tolerance values for Regression (table 55)

Variable name	Collinearity statistics	
Step One	**Tolerance**	**VIF**
Age	1.0	1.0
Ethnic Group	1.0	1.0
Step Two	**Tolerance**	**VIF**
Age	0.73	1.35
Ethnic Group	0.97	1.02
Executive Function	0.72	1.38
Step Three	**Tolerance**	**VIF**
Age	0.72	1.37
Ethnic Group	0.93	1.06
Executive Function	0.70	1.41
Pro-social Skills	0.86	1.15

Variance Inflation Factor (VIF) and tolerance values for Regression (table 56)

Variable name	Collinearity statistics	
Step One	**Tolerance**	**VIF**
Age	0.99	1.00
Ethnic Group	0.99	1.00
Gender	0.99	1.00
Step Two	**Tolerance**	**VIF**
Age	0.79	1.26
Ethnic Group	0.93	1.07
Gender	0.96	1.03
ToM	0.73	1.36
Step Three	**Tolerance**	**VIF**
Age	0.69	1.44
Ethnic Group	0.93	1.07
Gender	0.96	1.03
ToM	0.62	1.59
Executive Function	0.62	1.61

Appendix C

Study 4 (Chapter 5)

Parenting Styles and Dimensions Questionnaire (PSDQ)

Rate each item on a scale of 1-5 as to how often you exhibit this behavior with your child.

I exhibit this behavior:

1= Never

2= Once in a while

3= about half of the time

4=Very often

5= Always

		1	2	3	4	5
1	I encourage my child to talk about his/her troubles					
2	I guide my child by punishment more than by reason					
3	I know the names of my child's friends					
4	I find it difficult to discipline my child					
5	I give praise when my child is good					
6	I spank when my child is disobedient					
7	I joke and play with my child					
8	I withhold scolding/criticism even when my child acts contrary to my wishes					
9	I show sympathy when my child is hurt or frustrated					
10	I punish by taking privileges away from my child with little if any explanation					
11	I spoil my child					
12	I give comfort and understanding when my child is upset					
13	I yell or shout when my child misbehaves					
14	I am easy going and relaxed with my child					
15	I allow my child to annoy someone else					

16	I tell my child my expectations regarding behavior before the child engages in an activity					
17	I scold and criticize to make my child improve					
18	I show patience with my child					
19	I grab my child when being disobedient					
20	I state punishment to my child and do not actually do them					
21	I am responsive to my child's feelings and needs					
22	I allow my child to give input into family rules					
23	I argue with my child					
24	I appear confident about parenting abilities					
25	I give my child reason about why rules should be obeyed					
26	I appear to be more concerned about my feelings than my child's feelings					
27	I tell my child that I appreciate what he/she tries or accomplishes					
28	I punish by putting my child off somewhere alone with little if any explanation					
29	I help my child to understand the impact of behavior by encouraging my child to talk about the consequences of his/her own actions					
30	I am afraid that disciplining my child for misbehavior will cause the child not to like me					
31	I take my child's desires into account before asking the child to do something					
32	I explode in anger toward my child					
33	I am aware about problems or concerns about my child in the school					
34	I threaten my child with punishment more often than actually giving it					
35	I express affection by hugging, kissing and holding my child					
36	I ignore my child's misbehavior					
37	I use physical punishment as a way of disciplining my child					
38	I carry out discipline after my child misbehaves					
39	I apologize to my child when making a mistake in parenting					
40	I tell my child what to do					
41	I give into my child when he or she causes a commotion about something					
42	I talk it over and reason with my child when my child misbehaves					
43	I slap my child when the child misbehaves					
44	I disagree with my child					
45	I allow my child to interrupt others					
46	I have warm and intimate times together with my child					

47	When two children are fighting, I discipline the children first and ask questions later					
48	I encourage my child to freely express himself/herself even when disagreeing with parents					
49	I bribe my child to bring about compliance					
50	I scold or criticize when my child's behavior doesn't meet my expectations					
51	I show respect for my child's opinions by encouraging my child to express them					
52	I set strict well-established rules for my child					
53	I explain to my child how I feel about my child's good and bad behavior					
54	I use threats as punishment with little or no justification					
55	I take into account my child's preferences in making plans for the family					
56	When my child asks why he/she has to conform, I state: because I said so or I am the parent and I want you to					
57	I appear unsure on how to solve my child's misbehavior					
58	I explain the consequences of my child's misbehavior					
59	I demand that my child does/do things					
60	I channel my child's misbehavior into a more acceptable activity					
61	I shove my child when the child is disobedient					
62	I emphasize he reasons for rules					

سوالنامہ برائے والدین

Participant ID:

بچے کا نام:_____ عمر:_____ تاریخِ پیدائش:_____ کلاس:_____

آپکا بچے سے تعلق: والد _____ والدہ_____

آپکی عمر:_____ آپکی تعلیمی قابلیت: _____

نیچے دئیے گئے 1 سے 5 کے پیمانے (Scale) پر نشاندہی کریں کہ آپ مندرجہ ذیل رویئے اپنے بچے کے ساتھ کتنا عموما اختیار کرتے ہیں۔

1 =کبھی نہیں	**2=ایک آدھ دفعہ**	**3 = نصف اوقات**	**4=زیادہ تر**	**5 =ہمیشہ**

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	5 ہمیشہ
1	میں اپنے بچے کو ترغیب دیتا ہوں کہ وہ اپنی مشکلات کے بارے میں بات چیت کرے					
2	میں اپنے بچے کی راہنمائی زیادہ تر دلیل کی بجائے سزا سے کرتا/کرتی ہوں					
3	میں اپنے بچے کے دوستوں کے نام جانتا/جانتی ہوں					
4	میں اپنے بچے کو نظم و ضبط (Discipline) کا پابند کرنے میں مشکل آتی ہے					
5	جب میرا بچہ اچھے رویئے کا مظاہرہ کرے تو میں اسکی تعریف کرتا/کرتی ہوں					
6	جب میرا بچہ نافرمانی کرتا ہے تو میں اسکی پٹائی کرتا ہوں					

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	5 ہمیشہ
7	میں اپنے بچے کے ساتھ کھیل کود اور ہنسی مذاق کرتا /کرتی ہوں					
8	جب میرا بچہ میری خواہشات کے برعکس عمل کرے تب بھی میں اسے ڈانٹنے اور برا بھلا کہنے سے گریز کرتا/کرتی ہوں					
9	جب میرا بچہ رنجیدہ یا مایوس ہوتا ہے تو میں اسکے ساتھ ہمدردی کا اظہار کرتا /کرتی ہوں					
10	میں اپنے بچے کو سزا دینے کیلیئے اسے دی گئی مراعات /آسائشیں بغیر کسی وضاحت (یا بہت کم وضاحت) کے واپس لے لیتا/لیتی ہوں					
11	میں اپنے بچے کو بیجا لاڈ پیار کرتی ہوں					
12	جب میرا بچہ پریشان ہو تو میں اسکی بات سمجھتا/سمجھتی اور اسے تسلی دیتا/دیتی ہوں					
13	جب میرا بچہ بدتمیزی کرتا ہے تو میں اس پر چیختا چلاتا /چلاتی ہوں					
14	میں اپنے بچے کیساتھ بردبادی اور تحمل کا مظاہرہ کرتا/کرتی ہوں					
15	میں اپنے بچے کو دوسروں کو تنگ کرنے دیتا/دیتی ہوں					
16	کسی بھی کام /سرگرمی میں شرکت سے پہلے میں اپنے بچے کو اس کام سے متعلقہ درست رویئے کے بارے میں اپنی توقعات سے اگاہ کردیتا /دیتی ہوں					

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	ہمیشہ
17	میں اپنے بچے کی بہتری کیلئے اسے ڈانٹ ڈپٹ اور تنقید کرتا/کرتی ہوں					
18	میں اپنے بچے کیساتھ صبر کا مظاہرہ کرتا/کرتی ہوں					
19	میں نافرمانی کرنے پر بچے کو سختی سے پکڑتا /پکڑتی اور جھنجھوڑتا/جھنجھوڑتی ہوں					
20	میں اپنے بچے کو سزا سنا دیتا/دیتی ہوں پر عمل نہیں کرتا/کرتی (سزا نہیں دیتا/دیتی)					
21	میں اپنے بچے کی ضروریات اور احساسات کا خیال رکھتا/رکھتی ہوں					
22	میں اپنے بچے کو گھر کے اصول و قواعد کے بارے میں اپنی رائے کا اظہار کرنے کی اجازت دیتا /دیتی ہوں					
23	میں اپنے بچے کے ساتھ بحث کرتا/کرتی ہوں					
24	بحیثیت والد/والدہ مجھے اپنے بچوں کی تربیت کرنے کی صلاحیت پر مکمل بھروسہ ہے					
25	میں اپنے بچے کو اصولوں کی پابندی کرنے کی وجوہات سمجھاتا/سمجھاتی ہوں					
26	میں اپنے بچے کے احساسات کی بجائے اپنے احساسات کے بارے میں زیادہ فکرمند لگتا/لگتی ہوں					
27	میں اپنے بچے کو بتاتا/بتاتی ہوں کہ میں اسکی کوششوں کو سراہتا/سراہتی ہوں					
28	میں بغیر وجہ بتائے یا وضاحت کیے، بطور سزا اپنے بچے کو کسی اکیلی جگہ چھوڑ دیتا/دیتی ہوں					

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	5 ہمیشہ
29	میں اپنے بچے کو ترغیب دیتا/دیتی ہوں کہ وہ اپنے اعمال /رویوں کے نتائج کے بارے میں بات کرے تاکہ اسے عمومی رویوں کا اثرات سمجھنے میں مدد ملے					
30	مجھے ڈر ہے کہ اگر میں بدتمیزی /بدلحاظی کے نتیجے میں بچے کے ساتھ سختی کرونگا ٗ/کرونگی تو وہ مجھے نا پسند کرنے لگے گا					
31	میں بچے سے کوئی کام کروانے سے پہلے اسکی خواہشات کو مد نظر رکھتا/رکھتی ہوں					
32	میں اپنے بچے پر غصے سے پھٹ پڑتا/پڑتی ہوں					
33	میں اسکول میں اپنے بچے سے متعلقہ مسائل سے با خبر رہتا/رہتی ہوں					
34	میں اپنے بچے کو واقعتاسزا دینے کی بجائے سزاکی دھمکی زیادہ دیتا/دیتی ہوں					
35	میں اپنے بچوں سے محبت کا اظہار اسے چومنے اور گلے لگانے سے کرتا/کرتی ہوں					
36	میں اپنے بچے کے غلط رویوں /بدتمیزیوں کو نظر انداز کرتا /کرتی ہوں					
37	میں بچے کو تمیز سکھانے کیلئے جسمانی سزا کا استعمال کرتا/کرتی ہوں					
38						

	اگر بچہ بدتمیزی کرے تو میں اسے سرزنش کرتا /کرتی اور تمیز سکھاتا/سکھاتی ہوں					

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	5 ہمیشہ
39	اگر تربیت میں مجھ سے کچھ غلطی ہو تو میں بچے سے معافی مانگ لیتا/لیتی ہوں					
40	میں اپنے بچے کو بتاتا/بتاتی ہوں کہ اسے کیا کیا کرنا ہے					
41	جب میرا بچہ کسی بات پر ہنگامہ کھڑا کرے تو میں اسکی بات مان لیتا /لیتی ہوں					
42	جب میر ا بچہ بد تمیزی کرے تو میں اسے بات چیت اور دلائل کے ذریعے سمجھانے کی کوشش کرتا/کرتی ہوں					
43	جب میرا بچہ بدتمیزی کرے تو میں اسے تھپڑ لگاتا/لگاتی ہوں					
44	میرا اپنے بچے سے اختلاف رہتا ہے					
45	میں اپنے بچوں کو دوسروں کی بات کاٹنے اور ان کے کام میں مداخلت کی اجازت دیتا/دیتی ہوں					
46	میں اپنے بچے کے ساتھ گرمجوشی اور فرہت کے لمحات /اوقات گزارتا/گزارتی ہوں					
47	جب دو بچے آپس میں لڑرہے ہوں تو میں پہلے انکی سرزنش کرتا ہوں اور سوال و جواب بعد میں کرتا کرتی ہوں					
48	میں اپنے بچے کی حوصلہ افزائی کرتا /کرتی ہوں کہ وہ کھل کر					

	اپنے خیالات کا اظہار کرےچاہے وہ والدین سے غیر متفق ہی کیوں نہ ہو					

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	5 ہمیشہ
49	میں اپنی بات منوانے کیلئے بچے کو لالچ دیتا/دیتی ہوں					
50	جب میرے بچے کا رویہ میری امید کے مطابق نہ ہو تو میں اسے ڈانٹتا /ڈانٹتی ہوں اور تنقید کا نشانہ بناتا/بناتی ہوں					
51	میں اپنے بچے کے نقطہ نگاہ (Opinion) کا احترام ، اسے اپنے خیالات کے اظہار کی ترغیب دے کر کرتا/کرتی ہوں					
52	میں اپنے بچے کیلیئے سخت اور مستحکم اصول قائم کر رکھے ہیں					
53	میں اپنے بچے کے سامنے وضاحت کرتا /کرتی ہوں کہ اسکے اچھے اور برے رویوں کی وجہ سے میں کیا محسوس کرتا /کرتی ہوں					
54	میں بچے کو دھمکیوں کے ذریعے سے سزا دیتا/دیتی ہوں اور انکی وجوہات نہیں بتاتا/بتاتی					
55	میں خاندان کیلئے کوئی بھی منصوبہ بنانے سے پہلے اپنے بچے کی ترجیحات کو مد نظر رکھتا /رکھتی ہوں					
56	جب میرا بچہ پوچھتا ہے کہ اسکے لیئے میری بات ماننا کیوں ضروری ہے تو میں جواب دیتا /دیتی ہوں ، کیونکہ میں نے ایسا					

	کہا ہے یا کیونکہ میں تمہارا باپ/ماں ہوں اور میں چاہتا/چاہتی ہوں کہ تم ایسا ہے کرو					

		1 کبھی نہیں	2 ایک آدھ دفعہ	3 نصف اوقات	4 زیادہ تر	5 ہمیشہ
57	میں اپنے بچے کے بدتمیزانہ رویوں کی اصلاح کے طریقوں کے متعلق غیر یقینی کا شکار ہوں					
58	میں اپنے بچے کو اسکی بدتمیزیوں/غلط رویوں کے نتائج سمجھاتا/سمجھاتی ہوں					
59	میں اپنے بچے سے کام کرنے کا مطالبہ کرتا/کرتی یا حکم دیتا/دیتی ہوں					
60	میں اپنے بچے کے غلط رویوں کا قابل قبول سرگرمیوں میں ڈھالتا/ڈھالتی ہوں					
61	جب میرا بچہ بے ادبی کرتا ہے تو میں اسے مارتا/مارتی ہوں					
62	میں اصولوں کے بنیادی اسباب پر زور دیتا/دیتی ہوں					

Cronbach's Alpha for subscales MASCS (Study 4)

Subscales	**Number of items**	**Alpha**
Pro-social	8	.73
Antisocial	7	.74

Cronbach's Alpha for subscales PSDQ (Study 4)

Subscales	**Number of items**	**Alpha**
Authoritative	27	.92
Authoritarian	20	.91
Permissive	15	.57

Variance Inflation Factor (VIF) and tolerance values for Regression (table 71)

Variable name	Collinearity statistics	
Step One	**Tolerance**	**VIF**
Age	1.0	1.0
Step Two	**Tolerance**	**VIF**
Age	0.85	1.17
Executive Function	0.85	1.17
Step Three	**Tolerance**	**VIF**
Age	0.80	1.23
Executive Functin	0.85	1.17
MMST	0.94	1.06
Step 4		
Age	0.78	1.26
EF	0.84	1.18
MMst	0.92	1.08
Authoritative Parenting	0.95	1.04